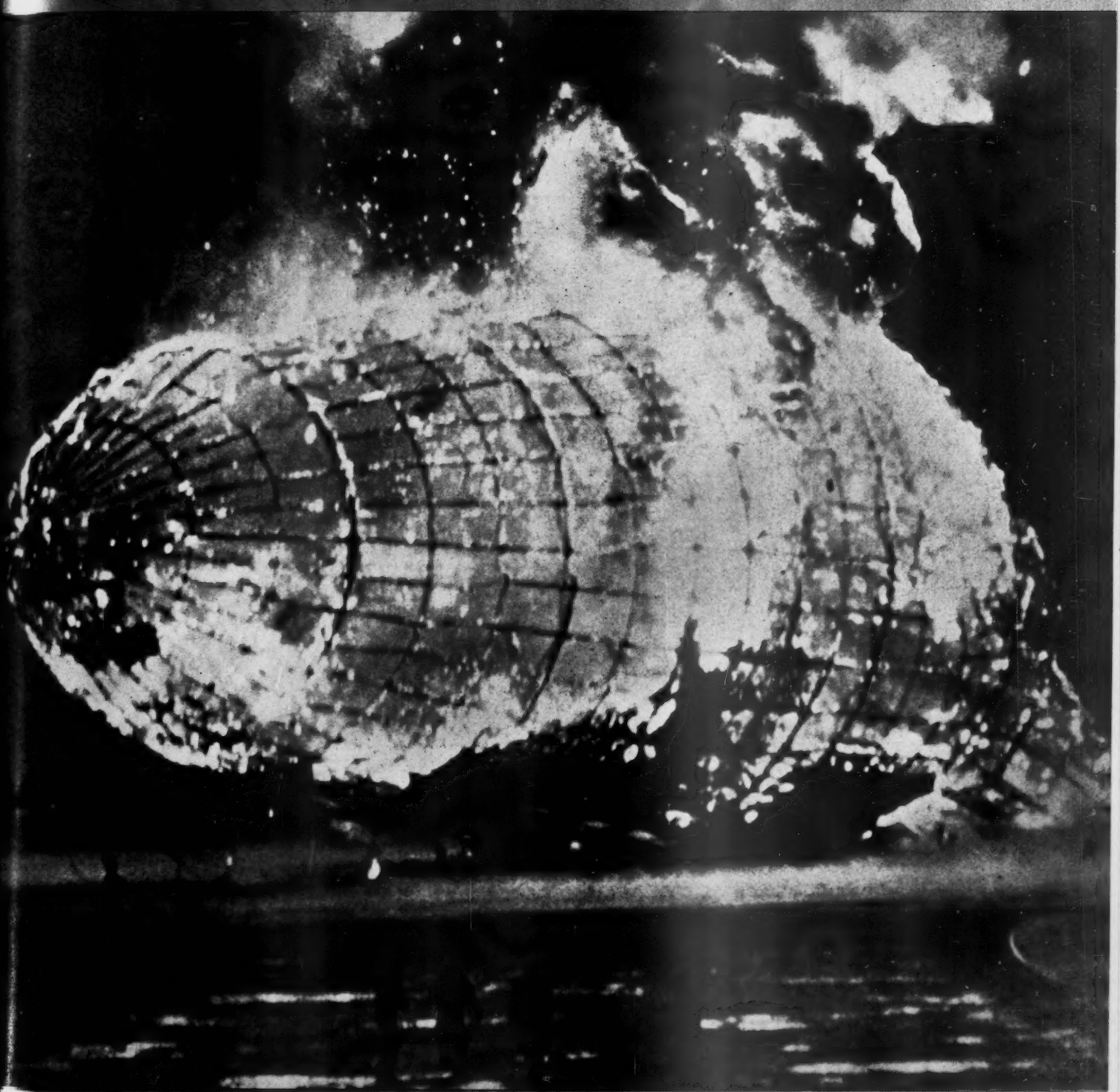
THE AMERICAN ENGINEER



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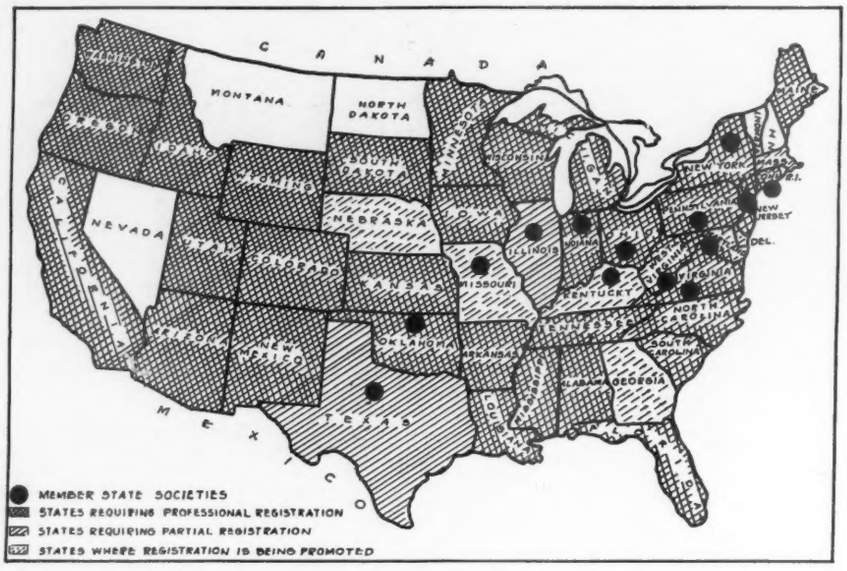

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THE AMERICAN ENGINEER

Volume Seven **MAY, 1937** **Number Five**

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THE COVER Photo by Acme News Pictures, Inc.

Our May cover shows the giant dirigible Hindenburg, a mass of flames from which human beings popped out like pop corn on a roaster. If you saw the "movies" of this disaster, your mind will always retain that vivid picture. Engineers are always socially minded in major disasters and technically minded as to cause and prevention.

The American Engineer assumes no responsibility for statements or opinions expressed by contributors. Their names identify the source of the same.

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Current Opinion

From the United States News

Whatever fate or fault of structure carried America's major dirigibles to their doom, none could have had the same end as the "Hindenburg."

The reason: The United States Government controls about 99 per cent of the world's supply of the non-explosive, non-inflammable, helium gas, which it keeps almost exclusively for the use of the Army and Navy.

While the German sky-ship had to carry the highly volatile hydrogen in its giant envelope, all of Uncle Sam's lighter-than-air craft, from the smallest observation balloons to dirigibles like the late-lamented queens of the sky, are held aloft with helium.

Although helium has the advantage over hydrogen of being a safe inflating material, it has two disadvantages. But even these are not as serious as they appear on the surface.

In the first place, helium has about 92 per cent of the lifting power of hydrogen. But experts say this difference is negligible.

In the second place, helium is more expensive. Its original cost is between three and four times that of the explosive hydrogen.

Even so, there are two factors which cut down the continuing expense of helium. Used gas of this type can be reprocessed and used again. Helium is not wasted as is the cheaper hydrogen. An example may be given thus:

As the "Hindenburg" on its way to this country burned up fuel, the ship became lighter. This made it necessary to "dump" some of the hydrogen. Since the gas is inexpensive, it was valved out into the air. This process was going on at Lakehurst as the craft was dropping to its mooring. A spark may have come in contact with the escaping explosive gas, and the "queen of the air" became a funeral pyre for more than thirty people.

Advantages of Helium

Had the "Hindenburg's" huge envelope been filled with helium, this is what would have happened: As the ship burned its fuel, the water produced in this process would have been condensed. The liquid would then have been used to stabilize the weight of the craft so that as it grew lighter from using up oil there would have been no need to "dump" any of the expensive inflating gas.

For all practical purposes, helium is obtained from natural gas. The wells producing it are located mainly in the United States, and these are largely in the hands of the Federal Government.

The main well, which is operated by the Bureau of Mines, is located near Amarillo, Texas. It produces 24,000,000 cubic feet of helium annually, enough to inflate three dirigibles the size of the "Hindenburg."

The History of Helium

Before the World War, helium was a scientific curiosity. About one cubic foot of the gas was in existence, worth nearly $2,500.

Realizing its value for lighter-than-air craft, the Government surveyed natural gas wells of the country. Experimental plants were erected at Petrolia and Fort Worth. After spending more than $10,000,000 in experimentation, a producing plant was established at Fort Worth in 1925.

The supply of helium in that area was exhausted in 1929, and the Government turned to the Amarillo area and bought 50,000 acres there to safeguard the supply.

Meantime, the Helium Company, now the Girdler Corporation, of Louisville, Ky., began commercial production at wells in Kansas and Colorado. It received a contract to supply the Navy with 4,000,000 cubic feet a year. In the second year, the Comptroller General ruled that the Navy could not buy helium from a commercial company at $34 a thousand cubic feet when the Government was producing it at Amarillo at $15. Today, the Federal plant produces it at a gross cost of $11.50 a thousand.

Lack of a commercial market prevented large-scale production by the Kentucky company, and kept up the price of its helium. The Goodyear-Zeppelin Company decided it could no longer pay $75 a thousand cubic feet, and made a two-year lease for a supply from the Government. The Girdler Corporation, therefore, has become virtually inactive.

In order to conserve helium for national defense purposes, Congress passed a law in 1925 forbidding its export except on approval of the President.

The Sheppard bill, just approved by the Senate Military Affairs Committee, would clip some of the red tape that has made it necessary for the President to approve every export made of a five-pound cylinder of helium. In addition, the bill would allow the sale of the gas by the Government to American commercial producers.

COLONEL BURRELL, EX-PITTSBURGHER, LAYS LOSS OF DIRIGIBLE HINDENBURG TO STATIC

From the Pittsburgh Post-Gazette

The man whose keen research gave the United States a world monopoly on helium gas—and forced the rest of the nations to use the treacherous hydrogen which brought the Hindenburg to destruction last week—was a visitor in Pittsburgh recently.

Colonel George A. Burrell, New York consulting engineer who formerly made his home in Pittsburgh, said during a visit to the Pittsburgh Field Club that he agreed with other authorities in the belief that static electricity had caused the frightful disaster that took 35 lives.

A piece of metal pushed about by one of the crew near a girder charged with static, or the proximity of two shifting pieces of metal within the framework itself would be sufficient to set off the tiny spark that brought the proud sky-liner to destruction, he said.

It was while Colonel Burrell was a United States Government engineer that he discovered the only known commercial source of helium in the world.

He was testing gases for the Bureau of Mines in the Texas fields during the period between 1908 and 1914 when he came upon a gas in several samples—about one part in 100—that appeared unfamiliar. Research disclosed it was helium, which up to that time had been developed by British and French scientists only in quantities too small for commercial use. Colonel Burrell was awarded the Distinguished Service Medal later for this discovery.

Foreign interests have tried to buy into the American monopoly for many years, one British combine offering several million dollars for the privilege of buying half the supply, but all the offers have been rejected as inimical to America's own national defense needs.

Helium, though three or four times as costly as hydrogen, is non-inflammable, and has 92 per cent of the buoyancy of the dangerous hydrogen.

EDITORIAL • • •

A Political Lesson for Engineers

There is no reasonable engineering purpose served in inflating a dirigible with hydrogen.

The fundamental reason for the Hindenberg disaster is politics! By this we mean that one nation controlling the only quantitative source of helium refuses to sell it to other nations, with National Defense as the reason.

Hydrogen, when pure, is a colorless, tasteless, odorless gas. Mixed with air or oxygen and ignited, it combines with explosive effect. Because of its relative cheapness and extreme lightness it has been used for the inflation of balloons for many years—always with the necessity of extreme caution to avoid contact with any flame.

Helium is non-inflammable, though almost as light as hydrogen, and can be made as effective for airship design as the slightly lighter gas. Until quite recently, it had not been manufactured in large quantities, and its cost has been extremely high.

The United States has held a monopoly on the manufacture of helium, there being but three plants in the world—these in the United States—the largest of which is owned by the Federal Government and is operated at Amarillo, Texas, under the supervision of the Navy Department.

Recently, Secretary Roper has stated, according to newspaper reports, that a way will be found to permit other nations to use our helium during times of peace. Dr. Eckener testified that the explosion was directly caused by the discharge of static electricity in a volume of leaking hydrogen.

Political expediency must often supersede engineering judgment, certainly in such a fundamental problem as National Defense. But when such a calamity as the burning of the Hindenberg occurs, it gives Engineers a sense that possibly Humanity cries out to him: "Engineer, why hast thou forsaken me!"

To which the Engineer can only reply: "We are constantly striving to raise the level of our professional standing so that you, the People, will place more dependence upon us in the matter of safeguarding life, health and property."

R. H. C.

NATIONAL SOCIETY NEWS

TRANSLATION

Paris, France
April 6, 1937

D. B. Steinman, President,
National Society of Professional Engineers,
New York City.

My Dear President Steinman:

Directed by our excellent President, Mr. Galopin, and my colleagues of the Society of Professional Engineers to draw up plans for the participation of the Society in external affairs, I hope to meet with your approval in setting forth some of the steps undertaken through the High General Committee of the Paris 1937 Exposition.

In the program that has been outlined, it is contemplated:

a) to make known to our colleagues of America the advantages offered to tourists during the Exposition.

b) to contact their organization with a view to an official reception within the grounds of the Exposition.

c) to study the means of preparing a grand Banquet within the Fair Grounds at a date coinciding with that of the reception to our American friends.

The other questions concern only our French colleagues.

I am pleased to make known to you the replies which have been received.

The following is for your information:

a) The announcements issued as publicity, in order that you may forward the same to your American Engineering colleagues.

b) The date of September 26th has been decided upon for the reception and International Congress of Engineers. Each attendant will be entitled to a card as a delegate which will entitle him to the privilege of free admissions and many other courtesies. Those who do not attend the Congress will be able to buy the card of identification, which will entitled them to the privileges indicated thereon, for the price of $1.

c) For details of the Banquet, kindly communicate with the Reception Committee.

We believe, my dear colleagues, that many of you will visit us and desire that none shall come to Paris without advising us in order that we may become acquainted and develop ties of esteem and friendship.

Also, I hope that the measures taken will be agreeable to you and that I shall have the pleasure of hearing from you by return mail.

I shall forward to you the announcements very shortly.

Anticipating the pleasure of your acquaintance, permit me, my dear President, to extend to you any my dear colleagues, assurances of our profound regard.

G. Fournier,
Vice President,
Society of Professional
Engineers, Paris, France

April 17, 1937

Ingenieur G. Fournier, Vice President,
Societe des Ingenieurs Professionnels,
19, Rue Viete,
Paris (17e), France.

Dear Ingenieur Fournier:

I have your letter of April 6th, and sincerely appreciate your cordial invitation extended to the Professional Engineers of this country to visit the 1937 Paris Exposition and to participate in an International Congress of Engineers which is scheduled for September 26th.

I am transmitting your letter to Engr. Arthur V. Sheridan, County Bldg., Bronx, New York, who has succeeded me as President of the National Society of Professional Engineers. President Sheridan knows your country and your language, having been in France with the Allied Forces during the World War, and I am sure he will be glad to extend your cordial invitation to the officers and members of our organization and to make such plans for cooperation and participation as can be arranged. You may expect his early response, as I know he has been heartily interested in the sympathetic contact that has been established between our two respective societies of professional engineers.

Faithfully yours,
D. B. Steinman

The New York State Society
of
Professional Engineers
Inc.

Grand Central Terminal
New York

April 26, 1937

Engr. Arthur V. Sheridan,
851 Grand Concourse,
Bronx, N. Y.

Dear Engr. Sheridan:

Enclosed herewith is a communication received from the Federal Emergency Administration of Public Works concerning its fourth birthday, which will occur on June 16th. I have advised the Assistant to the Administrator, Mr. Michael W. Straus, that The American Engineer is now published by the National Society of Professional Engineers, of which you are President.

Very truly yours,
John C. Riedel.

FEDERAL EMERGENCY ADMINISTRATION OF PUBLIC WORKS

Mr. W. A. Stubbs, Secretary,
New York State Society, Professional
Engrs.,
Grand Central Terminal,
New York City

My dear Mr. Stubbs:

On June 16, the Public Works Administration will reach its 4th birthday. In its four years PWA has carried out a public works program embracing 25,178 projects involving construction contracts totaling more than $3,000,000,000. With its funds useful projects ranging from sewage disposal systems to ferry boats have been constructed. Every county in the United States, save three, participated in this program. All of these projects drew upon the engineering profession for services and participation.

Marking its Fourth Anniversary, PWA is planning to report to the country a summary of its activities. It is our desire to make available to publications and professional societies such as yours many facts and figures summing up the accomplishments of this recovery agency. For publication on or about that date, we will have available news stories, pictures, charts and similar materials. We hope that you will find most of this suitable for possible publication in your journal.

It is likely that considerable national interest will be aroused by this date. May we suggest for your consideration that it might be timely for your society to devote particular attention to the PWA program during the month of June.

This office will be glad to provide material for your use if you will let us know what will be most useful. May we assure you that we will give you every possible cooperation in this connection.

Very truly yours,
Michael W. Straus,
Assistant to the Administrator.

May 10, 1937

Engineer Ernest F. Weeks, Secretary,
New Jersey Society of Professional
Engineers,
200 East 5th Street,
Paterson, New Jersey.

Dear Engineer Weeks:

I want to compliment you and your associates on the splendid meeting which I was privileged to attend on May 6th, at Singac, New Jersey, on the occasion of the Second Annual Northern New Jersey Regional Get-to-Gether of the New Jersey Association of Professional Engineers and Land Surveyors. The spirit of good fellowship that prevailed was evidence of a proper understanding of the prime purpose underlying the philosophy of this whole movement. Were it possible to have broadcast the spirit that prevailed to the forty-seven States, doubtlessly the trail to our ultimate objectives would be easily blazed.

I am indeed grateful to you and your associates for the hospitality extended to me, and may I suggest that a brief note covering the meeting be forwarded to Engineer Craig to supplement a copy of this letter which is being directed to him.

I am enclosing herewith a copy of a letter dated today addressed to Engineer George J. Martin, and I trust that the seed planted will bear fruit.

Sincerely yours,
Willard S. Conlon,
Executive Secretary.

May 10, 1937

Engineer Arthur V. Sheridan, President
National Society of Professional Engineers,
County Building,
Bronx, New York.

Dear Engineer Sheridan:

I represented you at the Second Annual Northern New Jersey Regional Get-To-Gether of the New Jersey Association of Professional Engineers on May 6th, in accordance with your request of May 5th. The meeting was held at Colonial Inn, Singac, New Jersey. There were approximately two hundred in attendance, and the interest in what N. S. P. E. is endeavoring to accomplish was gratifying. The Engineers in Passaic County Chapter are indeed to be complimented on the expeditious manner in

which the meeting was conducted. They are live wires and know where they are going and why.

Sincerely yours,
Willard S. Conlon,
Executive Secretary.

April 23, 1937

Engineer J. H. Dowling,
State Highway Engineer,
State Road Department of Florida,
Tallahassee, Florida,

Dear Engineer Dowling:

I had the pleasure of meeting Engineer Blair, and discussed with him the proposed amendments to your Engineers' Registration Law. Engineer Blair and I attended a conference with the officials of the organization you referred to in yours of April 15th, and in a discussion with Engineer Blair, following that Conference, I learned that your Committee will meet on May 1st, for further consideration of the proposed amendments. Because the time is so short I thought that you might be glad to have the suggestions referred to in the last paragraph of your letter, therefore, I would greatly appreciate your forwarding copies of your proposed revision to Engineers Arthur V. Sheridan, President of N. S. P. E., County Building, Bronx, New York; D. B. Steinman, Director at Large of N. S. P. E., 117 Liberty Street, New York City and S. I. Sacks, Chairman of the Legislative Committee, 921 Widener Building, Philadelphia, Pennsylvania at your earliest convenience, as I am sure that they would be delighted to offer further suggestions with respect to your proposed amendments.

Under Section 2 (e), Defining Professional Engineering, I note that your definition covers approximately eighty-four fields of practice and it further amplifies LB, Section 1, 2272 (b) in your present law. It would appear that in specifying a particular number of fields that your Board would encounter further difficulty in administering the law. For instance, you have specified, highways and streets. Sidewalks and curbing is essentially a part of some streets. Is it not possible that anyone, designing sidewalks and curbing is exempt under your present law. I merely state this specific item hurriedly to indicate to you that in endeavoring to define the many fields of practice doubtlessly there will be omissions, and it has been the experience of the majority of States that the definition as outlined in the Model Law, plus some minor modifications that are now being considered in the proposed revision of the Model Law are preferable.

With respect to Section 9, I quote here for the benefit of the gentlemen listed above who will not have copies of the proposed revision when they receive the copy of this letter.

"Section 9, Branches and Subclassifications. Professional Engineering in Florida shall be construed to include "Civil Engineering," "Mechanical and Industrial Engineering," "Electrical Engineering," "Chemical Engineering," "Mining and Metallurgical Engineering" and such other branches as may be determined by the Board. The Board may, by the adoption of appropriate rules, divide each or any one of the above branches into two or more subclassifications and may issue its certificates of Registration to such persons or person as it may find qualified to practice any one or more of the above named branches or subclassifications of professional Engineering."

I am of the opinion that you are giving your Board too much power. There is nothing to stop the Board from dividing the profession into many subclassifications which in the opinion of the Legislative Committee of N. S. P. E. is very undesirable. It is felt that there is no more reason for subdividing the Engineering Profession than there is for subdividing the medical or legal profession. An excellent example of the manner in which the Engineering Profession has allowed itself to be subdivided may be had by referring to a study that was made of the structure of the Civil Engineering Profession by Professor T. J. Hoover, it was found that among the members listed in the 1931 year book of A. S. C. E., at which time there were 14,518 members, associates, affiliates and juniors, there were 1,914 different titles of which 1,315 or 69% of the members bear unique titles; and among some of the outstanding were real estate engineers, job engineers, sewerage relief engineers, social engineers, etc. Further in a study made of the structure of Electrical Engineering using the 1931, A. I. E. E. year book, at which time there were 17,327 members, associates, juniors, etc., there were 3,753 different titles and more than 500 different kinds of engineers. Some of the titles were cost engineer, acting engineer, accounting engineer, relay engineer, transformer engineer, X-ray engineer, yard engineer, and 17% of the members bear unique titles to themselves. Is it any wonder that the layman is confused with the definition "Engineer" and surely the subdivision of our license laws can do naught but add to the confusion.

I might state that out of 38 states now having Registration Laws approximately 7 have subclassified registration and in the majority of cases they are dissatisfied with it and several of the States including New Jersey are now going to the additional expense to modify their laws in order that one license will be issued without reference to subclassification.

Since I started to dictate this letter I find that the organization with which we held our conference yesterday has agreed substantially to the modification suggested with the exception that the word "ACT" will replace the word "DEFINITION." Thus it appears that they agree not to oppose your proposed amendment if Engineer Blair's suggested Section 2 (f) reads substantially as follows: "Nothing in the ACT shall be construed to include the actual physical operation of any machine, engine or any type of prime mover of the immediate supervision thereof." This is merely by way of information, doubtlessly Engineer Blair will hear from them directly.

The proposed addition to the model law suggested by President Sheridan and now being considered is—"The practice of professional engineering shall not include the work ordinarily performed by persons who operated or maintain machinery or equipment."

We appreciate the opportunity to be of service to the Florida Engineers, and if we can be of further service to you please do not fail to call upon us.

Sincerely yours,
Willard S. Conlon,
Executive Secretary.
National Society of Professional Engineers.

Engineer Arthur V. Sheridan, President,
National Society of Professional Engineers,
County Building,
Bronx, New York.

Dear Engineer Sheridan:

The morning of April 21st, I delivered a lecture to a group which included all of the engineering classes and the faculty of the University of Maryland at College Park, Maryland on "Engineering Registration Laws." There were approximately one hundred and fifty present, and the keen interest displayed by the students was indeed gratifying.

At the time I told Dean Steinberg, at whose invitation I made the address, that as far as I knew the University of Maryland was among the first institutions to give its students an opportunity to become familiar with the professional engineers' licensure procedure, and I think it would be greatly appreciated by the Dean if you and Dr. Steinman both addressed a communication to him thanking him for the courtesy extended to N. S. P. E. and complimenting him on his progressive attitude toward registration.

Dean Steinberg is quite influential in the State of Maryland, and it was principally through his efforts that the Maryland section of A. S. C. E. changed its attitude toward registration. The Dean feels that there is no doubt that before the next legislature meets that he will be able to secure the support of those who are now opposed to registration, and that it would be unwise to endeavor to promote a State Society in Maryland at the present time.

As Dr. Steinman is familiar with the situation in Maryland with respect to the A. I. E. E., I think that he will agree with me that we can not secure their support for some time to come. Within another two weeks I expect to have another conference with the Dean, and I will try my best to bring forward the date at which a State Society will be organized.

Sincerely yours,
Willard S. Conlon,
Executive Secretary.

Engr. Willard S. Conlon,
National Press Building,
Washington, D. C.

Dear Engr. Conlon:

From your letter of April 28th addressed to Engr. Sheridan, I note that the Texas law has not yet been passed. My information, or rather misinformation, on the subject came from an item in Engineering News-Record, April 8th, page 536, which reported that Nebraska and Texas had just passed bills for the registration of engineers. Evidently the Engineering News item was premature. I was disappointed to learn from that article that the Texas law applies only to construction engineers. It would be a pity to have the law spoiled by such limitation or specialization.

(Continued on page 23)

An Interesting Article on Local Weather Forecasting

By **JAMES PORTER**

of The Association of Professional Engineers in the Province of British Columbia

Local Weather Forecasting Without Instruments

Many engineers, especially those in the smaller towns of the province, are in the habit of studying the weather indications as a guide in the laying out from day to day of the work which is being carried on under their direction. But it would be to the advantage of even those who spend their lives in large cities to form the habit of watching the sky. It can be a useful aid in maintaining their own mental efficiency through the direct contact which it brings about with an ever-changing field of nature. It will help them in a marked degree to resist the blunting effect on their powers of observation of their artificial surroundings, whose sameness can be depressing.

The object of the present memorandum is to offer some suggestions towards increasing the interest of weather observation by making it more systematic. The endeavour to record weather indications tersely but sufficiently is in itself a strong incitement to keen and accurate observation. The attempt to forecast the weather for 12 hours ahead in a variable climate like ours has all the healthy excitement of a game in which a man can hope to improve steadily by practice, though a retentive memory and long residence in the same place are essential for the highest degree of success.

The readiest way of forming the habit of watching the sky to some purpose is to spend two or three minutes every morning in observing and recording the indications, and four or five minutes at night in recalling and recording the weather during the day. Aeroplane pilots will of course need a regular training in meteorology, and learn to use the standard instruments and the daily weather reports and maps. That, however, is a special duty which the ordinary engineer is not called upon to perform.

The Mountains

The mountains should be watched daily. Most places in the province have the advantage of being within sight of peaks approaching or exceeding 4000 feet. The Hollyburn Ridge is useful to Vancouver observers, as it stands well forward. Taking the height of the plateau as 2500 feet at the brow, it is not hard to estimate within 500 feet how far down its southern slope a cloud-bank extends, and to observe its texture and duration. If it is soft and persistent or creeping gradually downwards, we should expect rain and wind. The bold peak of Crown Mountain is another object which is well worth watching, as the formation of a cloud-banner on its windward side is an early indication of rain.

Wind Direction

Wind direction need only be noted for eight bearings. The streets will usually serve for reference lines. The safest indicator of direction is the smoke from a chimney, as houses deflect the wind lower down. Sluggishness in rising during a calm is not a good sign as it shows that the atmosphere is lacking in buoying power through the presence of a large proportion of water-vapour, or that the solid particles of soot are being loaded with condensed moisture. The direction of drift of the clouds overhead is worth observing, though it will take a little time. It will often give advance notice of a coming change.

Wind Force

Wind force should also be noted. The accepted wind scale runs from 0 to 12; but a landsman can only use about half the numbers. The most useful are:—0, CALM, when smoke rises vertically; 1, LIGHT AIR, when chimney smoke is just definitely slanted; 2, SLIGHT BREEZE, which moves the leaves of trees perceptibly, and which can be felt on the face; 3, GENTLE BREEZE, which keeps the leaves and smaller twigs of trees in motion, and extends a flag of light material; 5, FRESH BREEZE, when "white horses" begin to show on seaarms and lakes; 6, STRONG BREEZE, which sets the larger branches of trees moving, and makes it hard to hold up an umbrella; 7, HIGH WIND, which sets whole trees swaying, and makes walking against it difficult.

Amount of Cloud

Amount of cloud can be quickly estimated with sufficient closeness, taking 0 for clear sky, and 10 for sky which is completely covered. It will be found very interesting to make a study of cloud forms for their own sake when we are in the open air, apart from the light which their formation and disappearance can throw on the problems of local forecasting. Those who wish to pursue the subject will find a useful chapter in the reprint of "Visibility and Cloud" from the "Instructions to Observers in the Meteorogical Service of Canada". A more detailed study will be found in Chapter 4 of "The

Date	Morning Notes					Evening Notes
	Weather during previous night	Mountain tops, and altitude of lower edge of cloud-bank	Wind	Cloud	Visibility	Weather at morning observations	Weather during day
2	Heavy dew	Clear	0	0	Clear	Sunshine	Fine all day
5	Hoar frost	Clear	1 W	5 Cirrus	Foggy	Sun w. cl.	Fog till 11 a. m.
11	Showers	Wisps 2400	3 SE	9 Cir-st	Clear	Drizzle	Fine afternoon
15	Heavy rain	Cloud 1500	2 E	10 Nimbus	Misty	Raining	Rain all day

Seaman's Handbook of Meteorology", published by H. M. Stationery Office, London. A pair of rather dark pince-nez of plain smoked glass will be found desirable by those who wish to make a study of cloud forms. Every observer, however, should be able to recognize the common forms. The feathery CIRRUS is a high-level, fine-weather cloud. The cirrus commonly develops before a change, into a veil of interlacing threads which render the sun and moon watery, and which frequently give rise to halos. This form is known as a CIRRO-STRATUS. It generally precedes a rain-storm, though this is not always the case in July and August, when a cool and cloudy day is often the only result. There is no mistaking the huge piled-up rounded masses of CUMULUS, which when pure is a fine-weather cloud.

Another fine-weather cloud is CIRRO-CUMULUS, which gives rise to the "mackerel sky". It is made up of small more or less rounded masses pretty closely arranged, and occupying a large area. NIMBUS or RAIN-CLOUD shows a thick dark shapeless layer, with trailing fringes at the place from which rain or snow is actually falling. STRATUS is a low-level, structureless layer of cloud, which differs from fog merely by being up in the air instead of resting on the ground. Pure stratus is best ignored by the amateur observer in his record, as the name is often misapplied. THUNDER-HEADS are not always seen to advantage near Vancouver. They have a dark base of nimbus, and usually show a flat top, which has led to the use of the term "anvil-cloud", the horn of the anvil appearing as a soft wispy horizontal extension. This extension is usually the most reliable indication of an approaching thunderstorm if the thunder is unheard.

Visibility

Visibility should be recorded as CLEAR, when streets a couple of miles away can be easily seen; SLIGHTLY HAZY; VERY HAZY; SMOKY; MISTY; FOG. Settled fine weather is usually accompanied by more or less haze during the hotter hours of the day. A pretty sure sign of rain is an overcast sky with a clear atmosphere which imparts a steel-blue tint to distant hillsides.

General Weather Conditions

General weather conditions can be recorded as CLEAR SUNSHINE; SUNSHINE WITH CLOUD; OVERCAST; DRIZZLING; SHOWERS, which may be LIGHT or HEAVY; STEADY RAIN; SNOWING. HEAVY DEW and HOAR FROST should be noted in the morning record. A note of the time of occurrence of hail or a thunderstorm will be of use at times to an engineer who has to supervise contracting work.

The record is most conveniently kept on a folio sheet of good open-ruled foolscap, which will serve for nearly a month, and which can present a complete spell of weather at once for reference and comparison. The recognition of these spells is a feature of all intelligent forecasting. Abercromby's book, "Weather", is still worth careful study on the subject.

No observer should attempt a record so elaborate that he cannot keep it up. It is the habit of observing and recording regularly which is the essential thing—not the practice of giving copious details fitfully. Specimen entries are given below, such as can be made in two or three minutes. An occasional day will need a second line. The day of the month should not be filled in until the morning notes are being entered. The foolscap folio will enable the observer to dispense with the excessive abbreviations which had to be made below, and to give more width for details in the evening record.

What Makes a Profession?

By Dr. D. B. STEINMAN

Past President, National Society of Professional Engineers

The term *profession* is defined by the Oxford English Dictionary to mean "a vocation in which a professed knowledge of some department of learning or science is used in its application to the affairs of others or in the practice of an art founded upon it."

A dictionary definition is obviously inadequate. Additional characteristics based on traditional development must be sought in delimiting the term. "Everyone recognizes the practice of medicine as a profession; everyone agrees that the lubrication of an automobile is not a profession. In between these obvious extremes lie many difficult cases."

In the Annals of the American Academy of Political and Social Science for January, 1937, Leonard D. White, Ph.D., member of the U. S. Civil Service Commission, amplifies the dictionary definition by listing the following as essential elements of a *profession:*

1. An *organized body of knowledge* constantly augmented and refined, and special techniques based thereon.
2. Facilities for *formal training* in this body of knowledge and procedures.
3. *Recognized qualifications* for membership in and identification with the profession. These may be established by law through *requirement of a license to practice,* although not all licensed occupations are professions.
4. An *organization* including a substantial number of the members qualified to practice the profession, and exercising an influence in the maintenance of professional standards.
5. A *code of ethics* which in general defines the relations of the members of a profession to the public and to other practitioners within the group, and which normally recognizes an obligation to render services on other than exclusively economic considerations.

Dr. White goes on to state: "A profession has prestige and distinction—social attributes desired by most individuals and groups. . . . A group does not make itself a profession by calling itself such. A profession is identified by characteristics which are commonly of slow development, gradually accumulating over the decades. A profession is distinguished by an appreciation, often vague, of *the social responsibility* of its members, and by control of their behavior on the part of the group in its organized capacity."

For the Engineering Profession, all of the specified characteristics have been fully recognized and the important considerations of *educational qualifications, legal recognition, organization,* and *social responsibility* constitute the keynotes of the program of the National Society of Professional Engineers.

The American Airship and the American Professional Engineer

***Remarks of* Hon. JOHN M. O'CONNELL of Rhode Island**

in the House of Representatives, Monday, June 1, 1936

(Continued from April issue)

This bill is as follows:

That for the purpose of fostering the American airship industry and to promote American overseas trade with use of commercial airships, to be available in time of war, to encourage American design, construction, and operation of airships, to demonstrate the value and profit of overseas airship service thus to promote its extension with private capital, and to provide immediate employment in American airship construction, the Secretary of the Treasury is hereby authorized and directed to lend the sum of $12,000,000 to the Respess Aeronautical Engineering Corporation for the purposes of constructing an American airship plant, an Atlantic operating terminal, and two airships employing the self-anchored suspension-bridge type frame, each airship having not less than 7,000,000 cubic feet of helium-gas capacity, and for operating such airships in commercial service between the United States and England or other European countries.

Sec. 2. The Secretary of the Treasury shall investigate the personnel and engineering organization of the Respess Aeronautical Engineering Corporation and he may require such changes in the present organization as he shall deem to be advisable before such loan is made, and he shall require that full insurance be carried to cover replacement in event of fire, damage, or loss of the airships or other property purchased or constructed with the proceeds of the loan until the full amount is repaid.

Sec. 3. Such loans shall carry interest charges at the rate of 3½ percent per annum, which shall cumulate for a 2-year period, and shall remain a lien on the patents, the patent rights, and all present and subsequently acquired assets of the corporation until paid. The loan, plus accumulated interest, shall be paid in 10 annual payments, the first payment to be made 3 years after the date of the enactment of this act, and any payments on account of the loan shall be deposited in the Treasury of the United States to be credited to miscellaneous receipts.

Sec. 4. There is hereby appropriated, out of any money in the Treasury not otherwise appropriated, the sum of $12,000,000 to carry out the provisions of this act.

This bill is for the purpose of providing a loan through which the development and operations of airships will be delegated by Congress to American engineers. It is a business proposition in which the Government extends its aid in forwarding an activity that is of extraordinary value to our Nation, an activity that has already been delayed too long.

The loan may provide the following:

1. Approximately 80 percent of the loan may be used in direct and indirect employment of labor.

2. It may give employment to great numbers of engineers and highly skilled men for whom it is now difficult to provide work in their respective lines.

3. It may construct two great airports, one being in the South and one on the Atlantic seaboard. These airports should be of great military value in event of war.

4. Within 2 weeks after the money is made available for this work several hundred men may be employed, and within a few months approximately 2,000 men may be employed in direct labor, with perhaps several thousand employed in indirect labor.

5. Many types of established industries would be benefited through orders placed for this activity. Approximately 25 percent of the loan may be expended for orders placed with major industries.

6. It may be the start of a great, new American industry and be the first step toward establishing a major form of overseas transportation through which our commerce with foreign nations may be expedited and increased.

7. With the evidence of Government support, as demonstrated by this loan, it is proposed within the year to arrange private financing for the continued construction of airships.

8. It is proposed, through the employment of three and in some cases four shifts of workers, the construction program may be completed in a period of about 12 months.

9. After a thorough test of the airships it is expected trans-Atlantic service may be established, with each airship making a round trip weekly between our Atlantic coast and England. If the loan is approved by this Congress, these airships may be in regular service before the fall of 1937.

10. Such service may expedite our mails and commerce to other nations of the world, to Europe, and to countries which are now best served by transportation from England or European countries.

11. It may in time establish the United States in a dominating commercial position, through fast and economical transportation direct to overseas commercial centers, including those within the interior of continents where rapid transportation is now unknown.

12. It may provide twice-a-week transportation across the Atlantic in less than 40 hours, which, with later improvement, may be reduced to 30 hours.

13. This may be America's answer in the race for faster ocean vessels, that in other countries are built with large Government-construction loans and are supported by annual operating subsidies of considerable size.

14. It will demonstrate to American inventive genius and skilled engineers the confidence of our Government in their ability to design and construct American airships. It will also demonstrate the superiority of American design and construction of airships.

In view of the fact the borrower must depend upon commercial operations for its profit, the construction would be at the lowest cost and of the best quality. No profit may be added nor any royalty be paid under the patents.

Considering the conditions for this loan, we should also consider estimates submitted on October 29, 1934, by the Honorable Ewing Y. Mitchell to the Federal Aviation Commission in the airship-construction program endorsed by the Department of Commerce. The two Goodyear-

Zeppelin airships would cost $10,750,000 and an Atlantic operating terminal to cost $3,000,000, making a total of $13,750,000.

With the loan of only $12,000,000 the Government would have for security two better, stronger, and safer airships of approximately the same size or larger than the Goodyear-Zeppelins, and an Atlantic operating terminal; also an airship construction plant costing approximately $4,000,000, making a total of $17,500,000, with the valuation based on the cost of two airships and a commercial airship terminal, being $13,750,000 in the Department of Commerce proposal. Further, $1,000,000 of the loan is either applied for additional construction or operating capital; also the patents and patent rights and all present and subsequently acquired assets of the borrower would be pledged as security until the full amount of the loan is paid.

The borrower is required to carry full insurance to cover replacement in event of fire, damage, or loss of the airships or other property purchased or constructed with the proceeds of the loan, until full payment is made. Insurance for these airships was taken up with a Lloyd's American representative, and at first 20 percent of the airships' value was required for annual payment. However, when further consideration was given to the suspension-bridge type of frame to be employed, the insurance charge was reduced to 15 percent and it was stated might be reduced to 10 percent.

The cost of insurance aptly illustrated the difference in the proposal submitted by the Department of Commerce and the present proposal for private construction and operation. Twenty percent annual insurance on $10,750,000 for two airships of the Zeppelin type would amount to $2,150,000, while 15 percent annually on the $5,000,000 cost of two American-designed airships would be only $750,000. Quite a difference, and similar differences would be shown by the sums required for depreciation, maintenance, interest, and so forth.

Another comparison is interesting. Mr. Mitchell, in presenting the Commerce Department airship-construction plan, told the Federal Aviation Commission that "Mr. Harpman, representative of the Goodyear-Zeppelin Corporation of Akron, Ohio, stated at our conference on the subject of airships that his company would enter into a contract for operation of the two airships and maintenance for 5 years on the basis of a dollar per year, if the Government desired them to submit a bid." This would seem to establish the value placed by the builders of the two airships, for which the Government would be required to pay $10,750,000.

Going back 4 years, when bill H. R. 8681 was before the House Commerce Committee, the Goodyear-Zeppelin Corporation offered to build airships and operate them in trans-Atlantic service to Germany if the Government would pay $32 per mile—in both directions but carrying mail in only one direction—for a reservation of 10,000 pounds of mail. This charge of $32 per mile for 8,000 miles, round trip to Germany, would have cost the Government $256,000 for transporting 10,000 pounds of mail across the Atlantic to Germany, or for only 1 pound of mail if only that amount were forwarded.

The Commerce Committee, did, however, recommend a payment of $20 per mile and the bill H. R. 8681 was approved on the floor of the House on June 15, 1932, thus a mail charge of $16 per pound was approved.

With the loan of only $12,000,000 the Respess Aeronautical Engineering Corporation proposes to establish twice-a-week airship service in both directions, carrying passengers, mail, and freight at only $1.50 per pound. They do not require that the Government send any mail on its airships; but if the Post Office Department wishes to use its services the charge per pound is the same as reservation for passengers, $1.50 per pound.

Further, instead of the Government buying airships at a high figure, possibly including a large profit, and leasing them back to the builders at $1 per year rental, the Respess Aeronautical Engineering Corporation shall repay the full amount of the loan plus interest, will maintain the airships in first-class condition, set aside funds to replace the airships when it is deemed necessary to retire same and will carry full insurance to cover replacement if an airship is damaged or destroyed, as well as liability insurance for passengers, mail, and merchandise.

That airships can do this is because the Respess airships will be safer, stronger, have a much longer useful life, be capable of carrying a larger pay load, and because of their simplicity and ease of construction these airships may be built in America at lower cost than Zeppelin airships can be built, with cheaper labor, in Germany.

That Respess airships may be operated at an attractive profit is indicated by an estimate of the probable annual receipts and expenditures for such service, as contemplated for the construction and operation of two 7,000,000-cubic-feet airships, each making a round trip weekly between our Atlantic coast and England or Europe.

Operating charges

Administration and communications	$300,000
Fuel and oil	850,000
Helium gas	300,000
Crew	300,000
Engine maintenance and replacement	500,000
Terminal charges	300,000
Contingencies	400,000
Insurance	750,000
Airship maintenance	500,000
Airship depreciation	500,000
Liquidation of construction loan	500,000
Interest at 3½ percent annually	175,000
Traffic solicitation and handling	660,000
	6,035,000

Estimated income

	Pounds
Total pay load available each trip	48,000
Total load 208 trips	9,984,000
Average 75 percent full loads	7,488,000
Average 80 percent of schedule trips	5,958,400
Income with $1.50 pound charge	$8,937,600
Deduct operating charges	6,035,000
Net profit	2,902,600

These estimates were submitted with realization that no service of this character has ever been operated, and consequently the figures must be taken as approximate. A sincere effort was made to estimate the operating charges high and the prospective income low. It is fair to state also the pay load is believed will be much more than 48,000 pounds.

Airships for commercial operations of this character must be strong and flexible in order to resist unusual or expected stresses during all seasons of the year and in all kinds of weather. They must have speed of at least 100 miles per hour for rapid transportation and to avoid storms so far as may be possible. They must be able to operate at relatively high altitudes if necessary in order to

avoid low storms or seek a level of most favorable air currents, and they must have these qualities without reduction of the useful load beyond the point of providing a profitable pay load.

There are two types of thoroughly tested engineering principles that may be employed in designing airship frames. One is that of the arch-type bridge, that requires a structural weight 40 percent greater than that of a suspension bridge of equal strength and capacity. If the arch-frame bridge were reduced 40 percent in weight it would not be capable of carrying the same load, and no bridge engineer could endorse the safety of such bridge for such load.

The suspension-bridge frame not only has the important advantage of reduced weight but receives stress on elastic steel bridge strand wire, and in this type of structure the stresses never reverse, therefore removing all fear of failure in the hull through fatigue and crystallization. In the operation of Zeppelin-frame airships reversal of stress, fatigue, and crystallization of the metal employed cannot be avoided.

That there is a need for safe American overseas airship service and ample opportunity for conducting such service profitably is supported by the House Committee on Commerce in its report on the merchant airship bill, House Resolution 8681, June 15, 1932, from which I take the following extracts:

The Committee on Commerce, to whom was referred the bill (H. R. 8681) to develop American air transport service overseas, to encourage the construction in the United States by American capital of American airships for use in foreign commerce, and to make certain provisions of the maritime law applicable to foreign commerce by airship, have considered the same and report thereon with amendments and, as so amended, recommended that the bill do pass.

The purpose of the bill is to promote national defense and foreign trade by having suitable American aircraft serving such trade and available for use in time of war. The creation of commercial air-transport services overseas as a supplement to the American merchant marine is a possibility that has only now become practicable by recent advances in applied science. There is ample evidence that the time has now come to use the air as the medium for rapid transport of the urgent portion of our business representatives, samples, and mails to overseas markets.

The speed of steamships has about reached its economical limit. To maintain a speed of more than 24 knots requires vessels of enormous size and cost. Freight and passengers cannot be found to fill such superships except on the North Atlantic, and even there international rivalry supported by governments has only pushed the speed up to 28 knots. Naval architects propose the ultimate ship of 30-knot speed, to cost twice as much as a 24-knot vessel, saving 1 day in the Atlantic crossing. Such ships, flying our flag, will cost approximately $30,000,000 each, of which amount three-fourths is required, under existing law, to be loaned by our Government at low rates of interest.

In the Pacific there is slight possibility of supporting from commercial revenues steamships of much greater speed than are now available. And yet in the Pacific our national and commercial interests may have the greater need for increased speed of transportation. To increase the speed of water transportation materially is usually prohibitive in cost, because the portion of passengers, mails, and goods that really require high speed is too small to fill at increased charges the great vessels needed to provide such speed.

The other side of the picture reveals the air over the sea as an available medium for the very high-speed transport by aircraft of this relatively small portion of the traffic now moving that is able to pay for time saved. Instead of a possible speed increase of 10 or 15 percent offered by steamships at a very great cost, aircraft offer the possibility of a speed increase of several hundred percent over existing means and at moderate cost. In other words, the economical speed for aircraft operations is high compared with that for vessel operations.

Today our trade and manufacture is not simply a matter of domestic industry and exchange. We have developed the principles and practices of quantity production to such an extent that we have become an exporting nation. This export field is new to our generation, but we are in competition with the old, experienced export nations of the world. If our future in this export field is to be a success we much proceed with a definite program of aggressiveness.

Once we had the leading position in the China trade until the Civil War destroyed the American merchant marine. We had the cream of that carrying trade, because we had the swiftest sailing ships in those days of sail and wooden ships. It was speed that won us the tea and silk cargoes.

In the Atlantic we have no geographical advantage, and if we are to receive our share of trade we must take the lead in securing closer contacts and better relations. Here our problem of maintaining a reasonable position in foreign trade is one demanding the greatest application of American ingenuity.

Europe is fast learning the lesson of mass production from American industry, and with its present almost unchallenged position in the field of steamship transportation, bids fair to assume a commanding lead in the Atlantic trade to the exclusion of her American competitors.

In the Pacific, geography has been more favorable to us. We are in the enviable position of being closest to the largest concentration of population on earth. We must take those steps now which facilitate intercourse and increase accessibility.

It is 6 or 7 days from San Francisco to Honolulu by steamship (one ship only making it in 4 days—the fastest on the Pacific), and approximately 14 days to Japan. It is 3 weeks from California to Manila and even longer to Hong Kong or Shanghai. Two months must pass before the average letter receives a reply. Trade must develop slowly under such conditions. Speed is essential for letters and documents, for samples and high-class express traffic, for orders, for the service of filling these orders, and for the transport of business representatives.

The application of airships of the *Akron* type to trans-Pacific service has been represented to the committee by responsible American business and shipping men as promising a profound alteration in the effects of geographical distance. For example, Hawaii can be brought within 36 hours of California, giving not only obvious trade benefits but also a powerful corrective to the unfortunate effects of the relative inaccessibility of our primary Pacific fortress.

Airship service to Manila can cut the travel time from 3 weeks to 6 days, and bring Shanghai, Hong Kong, and Tokyo as close to our west coast as London, Paris, and Berlin are by steamship from our east coast. Airships on the North Atlantic can deliver passengers, mails, and express in Europe in less than half the time now taken by the faster foreign steamships.

Such overseas air-transport services will be supplemental to the merchant marine, which must continue to

carry the bulk of passengers and mails and all of the heavy cargo. The merchant marine is supported by the volume of our foreign trade and will be benefited to the degree that airships succeed in stimulating this trade. Captain Dollar has well said, "When business representatives can visit their foreign customers more quickly they will go more often, get more orders, and our ships will get more cargoes."

The airship as a new vehicle for the service of our foreign trade can give an increase in speed over our existing fast steamers comparable to that following the replacement of sail by steam in the last century.

The volume of traffic now moving across the Pacific and Atlantic is enormous. For example, over 1,000,000 persons crossed the North Atlantic by steamship in 1930. Of these, 100,000 persons each way went first-class, and half of them booked passage at extra fares on the 10 fastest ships. An airship service to Europe, giving a sailing twice a week, would carry the small fraction of this traffic for whom time saving was really worth while.

Across the Pacific the present passenger traffic is very much less than on the North Atlantic. Even in 1929 but 100,000 persons crossed the Pacific. It is obvious that passengers do not travel when ships are slow and distances great. While the traffic available for the trans-Atlantic airship service is more than ample, the need for a speedier service across the Pacific is even more evident.

The weight of all mail dispatched from New York to Europe reaches annually nearly 40,000,000 pounds, of which about 3,850,000 pounds is first class. The weekly shipment of first-class mail by all steamers exceeds 69,000 pounds. With two airships sailing weekly, a large portion of this first-class mail could be expedited, but with a surcharge to the public in the form of an extra stamp the volume actually designated to be sent by air can be controlled by the post office. The post office can in this way adjust the relation between the compensation paid to the carrier and the surcharge paid to the post office.

Across the Pacific, like the passenger movement, the mail movement is less than across the Atlantic, the first-class portion of such mails being about 28 percent of Atlantic first-class mail. This quantity is within the capacity of airships to handle.

There is no international express business, but it is to be expected that a rapid air-transport service will develop such a business analogous to our domestic railway and air express. Newsreel films, machinery parts, style goods, plans, specifications, drugs and cultures, manuscripts, and samples may be counted on for such shipments. Also there will always be a great variety of miscellaneous merchandise which, through special attendant circumstances, must be shipped by the fastest means available regardless of cost. Such shipments may represent the specifications for new construction, a delayed order, machinery repair parts, technical apparatus, and the like.

There appears to be in our foreign trade a large potential volume of passengers, mail, and express that can benefit by time saving. These three classes of business should share in an equitable manner the expense of operating the Air Service.

The United States has in the past established itself as leader in fast overseas transportation, but today other nations have larger and faster ships. The construction and operation of these ships are possible only through very large Government construction loans and operation subsidies.

Rear Admiral H. I. Cone, retired, when chairman of the advisory committee of the United States Shipping Board Bureau, told the Federal Aviation Commission that "the Government should build a series of airships suitable for transoceanic passenger and express service." In that way, he declared, "the United States would assume world leadership in the aircraft industry, enabling us at the same time to recapture our lost position in the field of world shipping," adding "the United States will be left hopelessly behind unless we take steps for building airships to fill out our merchant marine."

In the consideration of building and operating commercial airships, with subsequent construction of additional airships with private capital, the operations as stated must be conducted at a profit. Thus, there are two vital points to be decided: The type and size of the airships to be constructed and the conditions under which the airships shall be operated.

In the choice of airships the type and size that provides the greatest strength and safety, with assurance of rendering the most valuable and commercial and military service, should be selected. The conditions under which the airships may be operated should give assurance of a reasonable profit, after providing for replacements, liquidation of principal, and interests on funds employed in the construction and in establishing the service.

I feel this is a matter of vital importance to our Nation. The airship is destined to become a major form of air transportation, and we will realize this fact within a very few years, perhaps after other nations have become well established, and we may not then obtain the dominating place, in overseas rapid transportation, which we may now achieve by prompt action.

Germany now has a sister ship to the *Hindenburg* under construction, is reported to be designing a larger airship, and is said to have signed a contract with Japan for two airships to be operated by Japan to our Pacific coast.

In conclusion, I desire to present some data concerning the possible value of the airship for military defense.

The *Akron* and the *Macon* had actual flying experience of only 3,257 hours before they met disaster through reported failure of their Zeppelin-type frame. How could such limited service determine the military value of airships?

Dr. William Hovgaard, member of the committee appointed by the Science Advisory Board to review and analyze the past and present situation as to the design and construction of airships, prepared an important article on Airships for Naval Service, published in the United States Naval Institute Proceedings, March 1936, in which the value of the airship for "coastal patrol-submarine detection," "strategic scouting—the airship as an airplane carrier," and "convoy and other services" is briefly but ably set forth.

Here is one outstanding aeronautical authority who appreciates the fundamental military value of airships. Under the section Convoy and Other Services Dr. Hovgaard says:

Rear Admiral W. A. Moffett has stated (before the House Committee on Naval Affairs, "During the World War, as far as we know, no convoy was ever attacked by a submarine when guarded by an airship."

Dr. Hovgaard further states:

It seems safe to say that for a country like the United States, with extensive coast lines, outlying possessions, and a great Navy, there will be, in time of war, a need for airships of all types from the smallest nonrigids to the largest rigid airships."

From a brief on airships, prepared at my request by Mr. Roland B. Respess, Cranston, R. I., inventor of the sus-

pension-bridge airship frame, which was published in the *Congressional Record* July 2, 1935, I extract the following:

A properly designed and constructed commercial airship may be adapted for military service. The military airship would have no passengers; therefore the interior structure, that may be built in for passenger use, could be removed and its weight, with the weight of the passengers, mail, express, and freight, would represent a very considerable lift that would be available for increasing the power for higher speed, for a larger quantity of fuel and oil for increased range of flight, or for military equipment such as airplanes, rapid-fire guns, ammunition, etc.

We are a commercial Nation. Airships for us should be constructed primarily as commercial carriers. Should we require these airships for military use we should change them, as explained, to be adapted for the particular military service to which they are intended to be employed.

For protecting our cities these great commercial airships could be quickly converted to carry many airplanes, have an airship speed exceeding 100 miles per hour, or be able to cruise slowly at a high altitude, over an area to be protected, sending out scouting airplanes to contact enemy planes, and when such planes are located the scout plane may direct the airships in a course to intercept the enemy planes. Thus, at the proper time, the airship may release a fleet of our most efficient fighting airplanes which may destroy the enemy airplane squadron.

If we had a sufficient number of these great convertible commercial airships, we could patrol and protect the areas surrounding our great centers of population and we could also establish and maintain a constant defense line a thousand miles from our coast, if desired.

The military value of an airship may be judged by its ability to withstand adverse weather conditions, by its useful load which may define its range, its speed, its military equipment, and by its likelihood of receiving serious injury when attacked by other aircraft.

The suspension-bridge structure of an airship is a type to stand adverse weather and is less vulnerable to gunfire than the Zeppelin-type frame. The gas is not under pressure and would leak very slowly, through holes made by bullets. Damage by heavier-than-air craft may occur only provided an airplane could get relatively close to the airship.

For military purposes the airship may be armed with a dozen or more rapid-fire long-range guns, so that at least two of these guns may cover approach to the airship in every direction. These guns could be fired with great accuracy and shoot farther than the guns carried by airplanes; thus in combat the airplane may seldom even puncture the fabric cover of the airship before the plane may be destroyed. In other words, the airship may be able to operate with less danger from enemy heavier-than-air craft than naval vessels.

As to the vulnerability of airships, so often referred to, our Navy ships are vulnerable to mines, submarines, surface vessels, and aircraft; our land forces are vulnerable on land and from the air, while the airship is vulnerable, over our own country, only to air attack. Nothing is safe in war.

75th CONGRESS—1st Session

H. R. 2252

IN THE HOUSE OF REPRESENTATIVES

January 8, 1937

Mr. O'Connell of Rhode Island introduced the following bill; which was referred to the Committee on Interstate and Foreign Commerce and ordered to be printed.

A BILL

Authorizing the loan of $12,000,000 for constructing two eight-million-cubic-foot American-designed dirigible airships, a large American airship plant, and an Atlantic operating terminal; and to establish twice-a-week American trans-Atlantic commercial airship service.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That for the purpose of fostering the American airship industry and to promote American overseas trade with use of commercial airships, to be available for military defense in time of war; to promote the improvement of dirigible airships by American engineers, scientists, and inventive genius who may provide improvements of greater strength and safety, more efficient control, with increased speed and larger pay load as compared with present airships, and to demonstrate the greater safety and efficiency of such American-constructed airships, with profit which may accrue from their commercial operation, thus may influence the extension of such operations with private capital; to promote the increased production of nonexplosive American helium gas for the use of American airships; and to provide increased employment of American professional engineers and skilled labor, the Secretary of the Treasury is hereby authorized and directed to lend to the Respess Aeronautical Engineering Corporation the sum of $12,000,000 for the immediate construction of two American-designed dirigible airships of not less than eight million cubic feet gas capacity and having a speed exceeding one hundred miles per hour, for the immediate construction of a southern airship plant comprising an airship dock in which two ten-million-cubic-foot airships can be constructed at the same time and a large airfield which shall provide ample space for the erection of other airship docks when required, for the immediate construction of an operating terminal for trans-Atlantic operations comprising an airship dock capable of repairing an airship of ten million cubic feet gas capacity with a large improved airfield to be available for national defense in event of war, and to establish American trans-Atlantic commercial airship operations with two dirigible airships, each of which shall be capable of weekly round-trip service.

Sec. 2. The engineering and operating personnel of the Respess Aeronautical Engineering Corporation, with associated engineers, scientists, inventors, and technical organizations, shall be of leading American professional talent and may include representatives of the Navy, Army, Commerce, or other departments of the Government.

Sec. 3. The Respess Aeronautical Engineering Corporation shall provide full liability insurance and to cover replacement in the event of fire, damage, or loss of the airships and of other property constructed or purchased with the proceeds of this loan, until the full amount of the loan and interest thereon is paid.

Sec. 4. The loan shall carry interest charges at the rate of 3½ per centum per annum, which shall cumulate for a two-year period and shall be a first lien on the patents, the patent rights, and all present and subsequently acquired assets of the corporation until paid. The loan plus two years' accumulated interest shall be repaid in ten equal annual payments, the first payment to become due three years from the date of this Act, and any payments on account of the loan shall be deposited in the Treasury of the United States of America and be credited to miscellaneous receipts.

Sec. 5. There is hereby appropriated, out of any money in the Treasury not otherwise appropriated, the sum of $12,000,000 to carry out the provisions of this Act.

ENGINEERING AIMS AND IDEALS

From an address delivered by Dean W. H. HITCHLER, at a recent meeting of the Harrisburg (Pennsylvania) Chapter of Registered Professional Engineers

Dean Hitchler is Dean of the Dickinson Law School at Carlisle, Pennsylvania, one of the oldest schools for lawyers in the United States.

DEAN W. H. HITCHLER

I suppose the profession of engineering, like other professions, is made up of many kinds of engineers, practicing their profession under all sorts of conditions, and facing all kinds of problems for their employers, their communities and themselves. There are doubtless in the profession men of widely varying training, background, and experience, with different opinions, activities, and relationships.

But in spite of these differences, I believe the members of the profession are so numerous, their training, in most cases, of such a superior character, the problems whose solution is entrusted to them so important and far reaching in their consequences, and their contacts in the public affairs of the nation so numerous and influential, that *the profession should be one of the most dominant and stabilizing influences in our national life.*

During the present century, it has become increasingly evident, whether we like it or not, that conditions have made the voice and work of an individual of ever decreasing significance and influence in the conduct of our national affairs. In order that the voice of an individual may be heard, his appearance must be dramatized and publicized with great elaboration; he must have the prestige of great office or the backing of a resourceful organization. Even then the effect of his utterances on public opinion and affairs is usually slight.

Today, the voice which is increasingly heard and heeded is that of organized groups, rather than of individuals. The views that carry weight are those expressed by these organized groups. The opinions that are listened to with respect, and carried into practical operation, are those reached by the representative groups of the members of the various activities of life.

Because of such conditions, it has become apparent that the engineering profession, like other professions, must organize, so that it may speak and act with an influence and effect, commensurate with its ideals and its training.

Engineers have, in many cases too tardily recognized this fact, and as a consequence the tasks which representative organization can accomplish have been too long delayed.

It is therefore a refreshing and inspiring circumstance when the engineers of a great State, organized as a functioning unit, meet together to ascertain the problems which confront their profession and to discover and perfect the methods of their solution.

But of course the mere facts of organization, and of meeting, though meritorious, will not of themselves be productive of greatly beneficial results.

The *merit and usefulness of an organization depend upon its character and upon its objectives.* An organization may be one which has not responded to the spirit and the demands of the times, and which does little more than hold annual meetings, or it may be an active and robust organization, doing vigorous and constructive things in a practical way, and winning the confidence and respect of the public. The people of the State have been pleased to observe that your organization is constantly swinging into coordinated action to meet and solve the problems which confront your profession and the public, and that more and more engineers of knowledge, character, energy and experience are attending your meetings, quietly making their influence felt, and gradually exercising a dominant influence in your organization, and, through it, in your profession.

The higher the character of an organization's personnel, the greater the perfection of its organization, The more vigorous and efficient its action, the greater is the importance of the character of its objectives. If, therefore, your organization is to be and continue to be an organization of usefulness, it is necessary that from time to time you stop to consider conditions, and to enquire what needs to be done.

The most important thought which has occurred to me in this connection is that *the time has come when the engineering profession should put the public interest and the public welfare in the first place.* This organization should have a broad outlook and a public minded vision as to its scope and purpose. Its form and extent should be measurably determined by its suitability and readiness to promote the public welfare. It should have a sense of fealty to the public as well as to private or purely professional interests. It should be remembered that the law which makes your organization possible, the law under which you are registered, was passed, in the words of the law itself, "to safeguard life, health and property," and that it defines a professional engineer as "one who initiates, investigates, plans and directs the control and utilization of the forces and materials of nature, and the human activities connected therewith, for the benefit of man."

There are many matters on which effective action of

(Continued on page 24)

Engineers and Tomorrow

The Opportunities for Service to Society Are in the Light of True Civilization—Obligations

By INGENIEUR

(Continued from April issue)

With the definite establishment of comprehensive written examinations as a requirement for the qualification of applicants who seek the right to practice professional engineering the necessity for revamping the curricula of the various engineering schools becomes increasingly evident. The undergraduate courses of instruction must in future be such as will enable the engineering graduate to pass his examinations for admission to professional practice. They should have a liberal cultural background plus a thorough training in the pure and applied sciences such as underlie the general practice of engineering rather than consist of electively intensive courses taken with a view to immediate specialization. In law and medicine the specialization comes after admission to general practice and the same should apply to engineering.

Professional specialization predicates personal adaptability and judgment. The person yet in his teens is in no position to make a well justified choice until he has had an insight into the field and possibilities of the profession generally. The requirements, the opportunities and the personal proclivities can rarely be known before the individual has made an excursion into the world of practice. The problem of the young engineer is as much one of conditions as is that of any young lawyer, doctor or architect. He must find himself, before choosing a specialty, if his career is to justify that choice. Interesting and worthy of consideration by all schools is the new curriculum established for engineering students by the Oklahoma Agricultural and Mechanical College. So well has the pamphlet of the Division of Engineering of that institution been prepared and edited that it merits complete publication. To Albrecht Naeter, head of the department of Electrical Engineering, the profession owes unstinted commendation for his appreciation of the need for better fundamental general training and less specialization for engineering students. Add to, introduce into, or require for admission thereto, sufficient cultural subjects to enable the young man to have a better appreciation of the place of the humanities in civilized society and the school would better serve both student and society.

One item in the report of Prof. Naeter is of the utmost significance and has been referred to many times by the writer in addresses and previous published articles. It is that entitled "Industrial Survey". Every practising engineer knows the information set forth therein is true.

Published in the Journal of Engineering Education
Vol. XXVI No. 10, June, 1936

A NEW GENERAL ENGINEERING CURRICULUM

A Composite Course of the Basic Technical Engineering Elements of General Civil Engineering, Power Electrical Engineering, Industrial Engineering, and General Mechanical Engineering

By ALBRECHT NAETER
Head, Department of Electrical Engineering, Oklahoma A. and M. College; and Chairman (1937), Electrical Engineering Division, the Society for the Promotion of Engineering Education

During the depression it became increasingly apparent everywhere that often there was little correlation between an engineer's specialized training and his industrial engineering work. This same lack of agreement is very evident in the published results of the engineering profession as prepared by the American Engineering Council from the 1930 Census. There has also been an increasing demand, in the past few years, on the part of Oklahoma industry for a more generalized training for engineers than is available under the specialized engineering curricula.

About three years ago I suggested in a meeting of Engineering Department Heads at Oklahoma A. and M. College that I thought the time was ripe for the consideration of a new type of engineering training. I proposed that it should consist of the basic technical engineering elements of civil, electrical, industrial, and mechanical engineering. The plan was taken under consideration for study by the departments affected. Several educational papers that have a pertinent bearing on the new curriculum have been published in *Electrical Engineering* in the two-year interval since I first proposed it.

In a paper entitled "Industry Demands an Engineering Education," L. W. W. Morrow emphasized that industry of the present and the future demands a large number of engineers for operation and management and only a small number for highly specialized engineering and research.

A paper, very significant in its implications on the new engineering training of the future, was presented by Past President Wm. McClellan as an A. I. E. E. 50th Anniversary discussion of "The Growth of a Profession." McClellan contrasted the unity of purpose and training of the legal, the medical, and the ministerial professions with the present endless diversification of the engineering profession. However, he emphazied that in spite of the numerous so-called engineering specialities, "from the engineering standpoint, they all ought to have a broad, fundamental knowledge of strength of materials, thermodynamics, electrimagnetic induction, hydraulics, flow of gases, and other basic underlying features of all engineering development." The speaker, in his anniversary address, said further that if this fundamental training is given, "any college graduate cannot do more, in the last two years of his course, than some specializing just exactly as the doctor in his four years' course in medicine and surgery may specialize during his last years in certain kinds of medicine or surgery." However, upon graduation all of these young doctors receive the same degree, thereby emphasizing first of all the fundamental unity of their profession.

This growing sense of the essential uniformity of engineering training is receiving support from another source that is likely to bring much pressure to bear, in time, upon the types of engineering curricula offered by colleges and universities of the near future. Engineering license legislation has been passed by a majority of the states in the union. Oklahoma joins their ranks this year. The Oklahoma law is similar to that of many other states in that it licenses engineers as professional engineers without indicating the nature of their respective specializations. Even though this feature of the law is so designed for the protection of the public, it is certain to stress the essential unity of the engineering profession. The first registration board has represented on it a majority of the engineering specializations active in this state.

As a by-product of the Oklahoma license legislation, an Oklahoma Society of Professional Engineers is now being formed. "The purposes for which this Corporation is formed are to: (a) Develop and maintain high professional and ethical standards among its members in their relationships with the public and with each other; (b) Promote the general welfare of the professional engineers of Oklahoma; etc." It is very likely that in time this organization will have much influence in consolidating the interests of the specialized groups, and in promoting the fundamental unity of requirements for securing licenses. This, in turn, will react upon the types of examinations set for licenses, and this will affect the college programs of engineering study.

After the suggested engineering curriculum was accepted in principle for the purpose of study, numerous committee meetings

* Presented at the Conference on Electrical Engineering at the S. P. E. E. Meeting, University of Wisconsin, June 23-26, 1936. Published in the *Journal of Engineering Education*, Vol. XXVI, No. 10 (June, 1936), permission to republish is gratefully acknowledged.

were held in order to select from each department the most suitable courses of study. The members of the committee were of the opinion that the new program should give a more general training than is now offered in any one particular branch of engineering. They accepted my original suggestion that the plan of study should be technical in content rather than managerial, the latter being a characteristic of many so-called general engineering courses that are now offered. Finally, the committee agreed upon a composite course containing the basic technical engineering elements of general civil engineering, power electrical engineering, industrial engineering, and general mechanical engineering.

In its deliberations the committee was guided materially by some statements made by W. E. Wickenden, as Director of Investigation for the Society for the Promotion of Engineering Education, in his "Preliminary Report to the Board of Investigation and Coordination and the Society." He said: "The engineer of tomorrow will not rise to leadership by abandoning his distinctive role or by permitting it to become ill-defined. He will do so by remaining essentially an engineer, by becoming a more competent engineer, by extending the reach of engineering methods and ideals to larger realms of life, and withal, by making himself a team-mate eagerly desired by other types of men. If engineering education is to serve these ends, it must safeguard all the distinctive qualities and virtues of its past and add to them a more necessary humanism."

It is felt that some safeguards would be necessary to keep the new course from becoming a "haven for lame ducks." To start with, each of the specialized engineering curricula at Oklahoma A. and M. College is patterned strictly in accordance with the recommendations of the Society for the Promotion of Engineering Education. Also, this new course contains essentially all of the courses required in the first three years of civil, electrical, industrial, and mechanical engineering, in their normal sequences. Since, in each case, the general engineering student is placed in the same classes with the particular specialized departmental students concerned, he is treated as a major student in that field and is expected to meet its requirements. Hence, there are no service courses in engineering for the general engineering student.

To meet this double duty for departmental courses in the future, the sequences of topics, and not the amounts of material, have had to be changed in only a few cases in specific departmental subject matter courses. This was done without weakening the contents of the courses for the specialized students. With these changes accomplished, no additional teaching loads and concomitant costs are imposed unless the new plan of study should attract students who otherwise would not have come to this college.

To strengthen the curriculum, senior level subjects from each of the four departments are included. As a further guard against "lame ducks," the graduation requirement was made 148 semester hours instead of 144, as in the specialized departments.

Particular attention should be paid to the method of administration of this new course. A new Department of General Engineering was organized with the Dean of Engineering as its Head. He is to be assisted by the heads of the four cooperating engineering departments and other staff members as needed. This organization prevents any feeling that General Engineering is a part of any specialized department, and insures excellent supervision.

New General Engineering Curriculum

These various considerations led to the formation of the following curriculum (in each case the last digit in the course number indicates the number of semester hours credit):

Freshman Year

Math. 144, College Algebra
Math. 112, Plane Trigonometry
Math. 124, Analytics
Chem. 114, 124, General Chemistry
M. E. 124, Descriptive Geometry
M. E. 112, Engineering Drawing
Engl. Comp. 113, 123, Freshman English
Shop 241, Forge and Heat Treatment
C. E. 124, Surveying
Mil. Sci. 111, 121, Military Science
Engr. 110, 120, Engineering Lectures (Orientation)

Sophomore Year

Math. 215, 223, Calculus
Phys. 215, Mechanics and Heat
Phys. 225, Electricity, Sound and Light
Chem. 283, Chemistry of Engineering Materials
C. E. 213, Mechanics, Statics
E. E. 212, Introduction to Electrical Engineering
E. E. 225, Electric, Magnetic, and Dielectric Circuits
I. E. 312, Manufacturing Processes
H. E. 213, Kinematics and Mechanisms
Mil. Sci. 211, 221, Military Science

Junior Year

C. E. 315, Strength of Materials
C. E. 352, Highway Engineering
C. E. 374, Reinforced Concrete
E. E. 324, Alternating Currents
Geol. 214, Engineering Geology
I. E. 313, 323, Industrial Organization
M. E. 313, Steam Power Plants
M. E. 311, Steam and Gas Laboratory
M. E. 323, Thermodynamics
M. E. 353, Machine Design
Shop 261, Machine Shop Practice
Engr. 300, Summer Practice

Senior Year

Engr. 411, 421, Seminar
C. E. 344, Elements of Structures
C. E. 453, Highway Bridges
C. E. 333, Hydraulics
E. E. 434, Alternating Current Machinery
I. E. 311, Time Study
M. E. 413, Internal Combustion Engines
Acctg. 424, Accounting for Engineers
Econ. 433, Economics for Engineers
Engr. 400, Inspection Trip
Electives, 10 semester hours

Industrial Survey

The members of the committee felt that it would be advisable to feel out industry for their reactions. The proposed curriculum was sent to prominent employers in the Oklahoma oil and gas industry, accompanied by a set of four specific questions. These questions, and their answers, all of which were similar, were well summarized by Professor C. A. Dunn, in an Oklahoma Engineering Experiment Station Bulletin on the New Engineering Curriculum, as follows:

(1) Does the industry you represent need young engineers trained along a specific line such as mechanical engineering, civil engineering, etc., or will a man generally trained be desirable?

Answer: In general, young engineers do not need specialized training.

(2) Will graduates with a broader training have more opportunities in your field than one of the specialized graduates?

Answer: Yes.

(3) Will it be necessary for those taking this proposed course to obtain a fifth-year degree in one of the departments to have an equal chance for employment?

Answer: No.

(4) Will the future of these graduates contain as many opportunities as the fourth-year specialized man.

Answer: More.

The oil and gas industry was chosen, because it is the largest employer of engineers in the state of Oklahoma, considering numbers already employed, and present employment programs.

Provision for Specialization

As the study progressed, it became apparent that some graduates, after having received their Bachelor of Science degrees in engineering upon completion of their general engineering course, might wish to specialize immediately in their studies. Others might desire to return to college for their specialized study after some years of experience in industry.

Accordingly arrangements have been made with the cooperating departments of civil, electrical, industrial, and mechanical engineering whereby a student upon completion of his requirements for the degree of Bachelor of Science in Engineering can obtain the Bachelor of Science degree in any of the above-mentioned departments upon completion of an additional year's work. The members of the committee were agreeably surprised to find this specialization possible in so short a time.

After the graduate of the four-year course in general engineering has decided that he wishes to specialize in some particular branch of engineering, either as a result of finding himself in college or becoming oriented in industry, he may then make his choice of specialization. The committee examined several existing curricula, made up of composite courses of the same four cooperating departments and offering fifth-year specialization, but in every case the choice of specialization had to be made not later than the beginning of the senior year. The *after-graduation* choice represents a decided advantage over the senior-year choice in that the general engineering graduate has then had more of a chance to become oriented.

While the study of the committee was developing, it was urged by some that course material of one or more additional departments should be added to the new general engineering curriculum.

Examination soon made it clear that this addition would remove the after-graduation choice of specialization with its concomitant completion of specialization in a particular branch of engineering in one year's time. Hence, the new curriculum was limited to four departments. Also, some departments, such as chemical engineering and architecture, require so much specialization to insure a reasonable chance of professional success that they do not lend themselves so readily for use in a composite program of study.

In line with the general trend towards cultural training for engineers, provision was made for 10 semester hours of electives in the senior year. Even though the technically inclined student may wish to get a certain amount of specialization through careful use of electives, yet the electives may be made up entirely from subjects not of an engineering nature. In fact, cultural subjects are recommended.

Name for New Course in Engineering

The members of the committee debated at length concerning the choice of a proper descriptive name for this new engineering curriculum. They felt that "basic" engineering most nearly described the content, but recognized the fact that this term had no generally accepted meaning in either the engineering world or in industry. At the same time, the committee realized that general engineering, in its ordinary usage, connoted considerable emphasis upon managerial studies, and usually a wide range of electives in liberal amounts. Finally, it was decided that perhaps it was best at first to label it, in the college catalog, as General Engineering with the subtitle description of "composite course including the basic essentials of civil, electrical, industrial, and mechanical engineering."

Conclusions

This new engineering department is *not* intended to replace present departments, but is added to give a more general technical training than is now available in any one particular branch of engineering. It should meet admirably the requirements of the operative and managerial group of Morrow's report. At the same time, some of our faculty members believe that it should also form a good foundation for specialized training. When specialization is placed on the firm foundation of this new general engineering course, then it meets Wickenden's ideal in that this "professional education for engineers is not a separate route, but a second mile" built upon a thorough functional training for the large operative and managerial group. In line with Past-President McClellan's address at the A. I. E. E. 50th Anniversary Convention, this new type of training may form the nucleus of a united engineering profession.

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Individual skill, specialization and responsibility must be developed upon a base which merely indicates that a person has given evidence of fundamental qualification sufficient to safeguard society. Specialization should come after sufficient experience to enable practice and study to be combined.

The efforts of every engineer should be directed in the common interests of society and profession. School, examining boards and professional associations must collaborate in developing the engineer of tomorrow. The latter must, as far as possible, be socially minded, capable of administration and fundamentally trained for active participation in public affairs. He must be a cultural and spiritual person as well as a trained specialist. This demands a liberal training as well as a thorough understanding of mathematics, physical sciences and the fundamental principles common to all branches of engineering. Such should be the common denominator by which all engineers can be measured.

The engineer, to be worthy of or to merit recognition, must consider his talents in the light of public opinion. How he regards himself is only valuable when it is supported by what others think of him. Self praise has received too many appraisals, both poetic and prosaic, to justify further dissertation. The engineer cannot hope to help himself until he manifests willingness and ability to help humanity. He must place his talents at the service of his fellow man in order that he may direct the civilization and enlighten the society which he has made possible.

Recently, President Roosevelt sought to impress upon engineering schools the necessity for developing in students a greater appreciation of the engineer's responsibility as well as his opportunity for promoting human welfare. The President's appeal was almost coincident with a similar petition in a form of resolution adopted by the National Society of Professional Engineers at its Convention in Washington on October 12th, 1936. Unfortunately, several prominent representatives of engineering schools and technical societies seemingly missed the purport of the President's communication and to an extent took issue with him. At the time the National Society of Professional Engineers alone supported the Presidential appeal. This concurrence of opinions resulted in a personal communication addressed to the speakers as the President of the National Society of Professional Engineers wherein is set forth in masterly fashion the vision and the hope of one whose grasp of the engineer's role is such as to cause the profession to blush.

This communication which, for style, expression and soundness of thought, merits a place with those which have so greatly aided in immortalizing Lincoln cannot be reproduced in full because the President himself has marked the same 'personal'. Following are excerpts which suggest that as a sociologist, economist and psychologist President Roosevelt, while professing no specialization as such, has probably had no peer in this generation and perhaps in any previous one.

> *"The major premise of my letter of October 7, held by all serious students of the problem, is that the objective is not one of less science and less engineering, but of better adaptation of economic and other social institutions to receive the impact of more science and more engineering. In fact, many hold that unless such better adaptation is effected, science and engineering may become retarded by an uninformed movement, of which symptoms have already appeared, for their restriction on the assumption that there can be too much technical improvement.*
>
> *"'Too much' and 'too little' are relative terms. Superficially there may appear to some people to be too much technology because our economy has not absorbed its great achievements smoothly. But the concept on which we should base our purposes is that there has been too little adjustment of economic and other social institutions to fit them to receive and benefit from technological advance without causing distress to many people.*
>
> *"Science has made our present culture possible; more will make possible a culture freer still from drudgery in the labor of providing subsistence and wide enjoyment of the satisfying things of life. Therefore our constant purpose should be enlargement of scientific knowledge. For promotion of that purpose, however, we must constantly readjust economic and social institutions to receive each new increment of science and engineering in such manner that the constant purpose will be more smoothly and surely attained.*
>
> *"All professional groups, and especially business, can with clearer understanding help in the achievement of this goal; but the engineering profession is in a position of unusual privilege and corresponding responsibility in the matter. Because of their special training they have potential ability to perceive earlier and more clearly than others the ultimate technical*

(Continued on page 24)

COLLEGE AND UNIVERSITY ACTIVITIES

Seventeenth Annual

TRAINING AND EXECUTIVE CONFERENCE ON INDUSTRIAL PERSONNEL

Held By

The School of Engineering
The Pennsylvania State College

PROGRAM

A Conference for the discussion of *Industrial, Economic, and Social* forces affecting education for work in industry and the training of those already in the ranks of industry.

May 5, 6, and 7, 1937

State College, Pennsylvania

Wednesday, May 5

11:00 a. m.—Registration—Nittany Lion Inn.

2:00 p. m.—Chairman, W. P. Langworthy, Allegheny Steel Corporation, Brackenridge; Significance of Training as a Part of Management—V. W. Conover, Director of Training, United States Steel Corporation, New York City; Discussion.

3:30 p. m.—Relationship of Training to the Supervisor's Responsibility—Panel Discussion by Following Members: L. O. Neff, American Steel and Wire Company, Donora, Chairman; F. E. Muder, Aluminum Company of America, New Kensington; W. W. Sieg, Titan Metal Company, Bellefonte; Don Smith, General Electric Company, Erie; Harry Langdon, SKF Industries, Philadelphia; Discussion.

7:00 p. m.—Dinner—Informal; Toastmaster—R. L. Sackett, Dean, School of Engineering, The Pennsylvania State College; Greetings from J. O. Keller, Assistant to the President in Charge of Extension, The Pennsylvania State College; Present Conditions of Employer-Employe Relations—Edward S. Cowdrick, Consultant on Industrial Relations, New York City.

Thursday, May 6

9:30 a. m.—Chairman, J. S. White, Industrial Bureau, Philadelphia Chamber of Commerce; Significance of Training in Light of Present Industrial Trends—E. N. Montague, Assistant Director, Occupational Research Program, Division of Standards and Research, United States Department of Labor, Washington; Discussion.

10:30 a. m.—Sources of Labor and Methods of Selection and Placement—James W. Towsen, Personnel Director, West Virginia Pulp and Paper Company, New York City; Discussion.

12:30 p. m.—Luncheon.
Presiding—R. L. Sackett, Dean, School of Engineering, The Pennsylvania State College.

2:00 p. m.—The Young Engineer in Finance—Albert M. Jones, Chase National Bank, New York; Discussion—C. E. Bullinger, The Pennsylvania State College; S. C. T. Dodd, Peoples Pittsburgh Trust Company; Post Depression Reconstruction of Industrial Personnel and Its Effect on the Training of Technical Graduates—R. C. Muir, Vice-President, General Electric Company; Discussion—A. R. Mathieson, United States Steel Corporation; C. W. Beese, Armstrong Cork Company; E. B. Roberts, Westinghouse Electric & Manufacturing Company.

6:00 p. m.—Dinner—Nittany Lion Inn—Informal; Joint meeting with local section of A. S. M. E.; Entertainment; Toastmaster—Fred M. Feiker, American Engineering Council; Greetings—President R. D. Hetzel, The Pennsylvania State College; The Influence of Social Change on Industry—James H. Herron, President American Society of Mechanical Engineers—Dean R. L. Sackett.

Friday, May 7

9:00 a. m.—Chairman, K. M. Irwin, Philadelphia Electric Company, Philadelphia; Personality in Industry—C. D. Stewart, Chief Engineer, Westinghouse Air Brake Company, Pittsburgh; Discussion—Ralph M. Ferry, Aluminum Company of America; P. H. Powers, West Penn Power Company; William F. James, Westinghouse Electric & Manufacturing Company; Post-Graduation Development of the Young Engineer—O. W. Eshbach, American Telephone & Telegraph Company. Discussion—President R. E. Doherty, Carnegie Institute of Technology; A. O. Morse, The Pennsylvania State College.

12:30 p. m.—Luncheon and Round Table—Nittany Lion Inn.

Committee on Industrial Training

W. B. Langworthy, Allegheny Steel Company, Brackenridge, Chairman; E. S. Kostro, Philadelphia Storage Battery Company, Philadelphia; Harry Langdon, S K F Industries, Philadelphia; F. E. Muder, Aluminum Company of America, New Kensington; P. B. Ray, Titan Metal Company, Bellefonte; J. S. White, Philadelphia Chamber of Commerce, Philadelphia.

COLUMBIA UNIVERSITY
In the City of New York
School of Engineering

April 27, 1937.

Mr. D. B. Steinman
117 Liberty Street
New York, N. Y.

My dear Dr. Steinman:

Thank you very much for your letter of April 19th and its most appropriate comments on the draft report about professional recognition in Architecture. I have organized some pertinent material and with this letter as an opportunity, will write it out.

Q 1. "What is regarded by the profession as constituting admission to the profession of architecture? In other words, when does a man become an architect?"

A 1. A man is generally recognized by the profession as an Architect when he has been licensed by the State in which he practices Architecture. Many "draftsmen" working in a firm may amply measure up to license requirements, but remain "draftsmen" until licensed.

Q 2. "Does registration precede membership in the professional society, Does the American Institute of Architects now require registration as a prerequisite to full membership, in the case of residents of states having registration laws?"

A 2. No. Although at the present time, an architect in a state requiring licensure, could not secure the experience required for professional society membership unless he was licensed to practice. Therefore licensure practically always precedes membership in the Institute.

Q 3. "Are there any other societies of architects that maintain this requirement?"

A 3. Yes. Some of the local societies (such as the New York Society of Architects) require licensure by the State as a qualification for membership.

Q 4. "On page 42, you record Mr. Kemper's guess that 90% of the members of the Institute are registered. Does this percentage apply to the entire membership or only that portion located in registration states? Does the missing 10% represent members who have failed to register or members who reside in non-registration states? Or is the missing 10% due to members who were admitted prior to the enactment of registration laws? Has the Institute written any registration requirement into its constitutional specifications for membership?"

A 4. The 90% figure applies to the whole membership. The missing 10% represents members who reside in non-licensure states. The Institute has not written in any registration requirement into its specifications for membership.

Q 5. "On page 43, you give figures for the number of licenses in suspense in various states. Are the suspended registrants residents or non-residents? Or is it a temporary condition due to the depression? Have deaths been deducted? To what extent

Analysis of Licenses suspended or revoked in the Practice of Architecture

Date of Enactment of Law		*Licenses in Force*			*License Revoked*	*Date for Figures*
		Resident	*Non-Resident*	*Total*	*Total*	
1897	Illinois	..	..	1335	1303	Mar. 1937
1927	Iowa	104	32	136	53 (cancelled) (15 residents, 38 non.) No. of deaths, 9, June '36 (Total reg. 407)	
1921	Minnesota	..	..	300	76 (10 in suspense, 66 cancelled) No. of deaths 31, Dec. '36.	
1925	So. Dakota	24	21	45	27 (3 res. 24 non.)	7/ 1/34
				48	(1926-1935) (No. of deaths 8)	7/ 1/36
1917	Wisconsin	317	108	425	190	7/31/35

do these figures represent retirement from the profession in advanced years?"

A 5. The tabulation below represents the available data on suspended registration, deaths, etc.

From the data it is seen that the suspended registrants are largely non-residents, (cancellation probably being due to the depression). Deaths have been shown separately. The figures probably do include a small number of retirements.

The material for the other professions still requires much working over. As the results mature I will follow up your kind offer of a conference on these problems.

With my thanks again and regards,

Most sincerely,

(Signed), A. D. HINCKLEY,
Ass't. to the Dean.

RESEARCH FOUNDATION FORMED AT OHIO STATE

Columbus, O.—Organization of the new Ohio State University Research Foundation has been completed with the election of officers and directors.

The foundation was incorporated last November to bring about a closer cooperation between the university and industry, particularly in making the university's laboratory and research facilities of greater helpfulness in solving the problems of industry.

Officers elected to launch the new enterprise are: George W. Rightmire, president; Carl E. Steeb, treasurer; Hurlbut S. Jacoby, secretary and director. All officers are on the university staff.

Membership of the foundation includes 10 councilors from national industries, 10 Ohio State alumni members, 10 councilors from Ohio industries, members of the university board of trustees, deans of the various Ohio State colleges, directors of campus research bureaus, and the director of the Ohio Agricultural Experiment Station at Wooster.

PERMANENT FLOOD CONTROL

From an Editorial from The Bridgeport Post, Connecticut

Prof. P. A. Herbert, member of the Michigan Planning Commission and professor of forestry at Michigan State College, says that this country is going to continue to have floods, more floods and worse floods, if our attempts at flood control are confined to concrete dams, dykes, levees and similar engineering works without a definite attempt to arrest floods at their source.

"Billions of dollars have been spent in this country for flood control," says Prof. Herbert, "but our floods are becoming more frequent and more destructive."

This was stated a month ago, but present happenings in the Ohio river valley would seem to give considerable point to Professor Herbert's remarks. He says:

"No one can control and prevent floods after the water has reached the larger streams. Now we build huge levees on the advice of engineers to hold the water in the channel.

"Then we have to send militia to route the farmers who resist efforts to dynamite and tear them down again so that city property down stream can be saved. It is only natural that farmers having located behind the security of a levee will oppose effort to flood their farms and homes by dynamiting the levee that protects them.

"Construction of levees probably will be found to be a minor factor in permanent flood control. Much of the soil carried in the flood waters is deposited on the bottom of the river and as the bed of the river is built up the levees will have to be raised.

"In time this will result in a condition where the bottom of the river will be higher than the original river banks and the levees will have to be constructed higher and higher. Engineering will truly put our rivers up in the air.

"Flood control consists of preventing the washing of soil into our streams by adequate vegetative cover such as can be obtained by correct agricultural and forestry practices. Such vegetative cover will also make it possible to increase the amount of rain the ground can absorb and otherwise retard the drainage of rain and melting snow into our rivers.

"However, even with complete vegetative cover and minimum soil erosion more water will at times accumulate on a watershed than the ordinary river channels and absorption of the ground can handle."

So far as flood control dams are concerned Professor Herbert favors numerous small dams on the headwaters of the smaller streams rather than a few great dams.

The smaller dams are more effective, and they benefit the area which is temporarily flooded. They are, in proportion to water impounded, less expensive to construct than the huge dams and they do not blight the neighborhood as large flood-control dams do.

HEADLINE FOLK AND WHAT THEY DO

Washington Star, April 23, 1937.

COMMISSIONER CALLS NEW YORK PLUMBERS SANITARY ENGINEERS

By Lemuel F. Parton

New York plumbers are to be called "sanitary engineers" by the mandate of Samuel Fassler, commissioner of buildings. They're marking up everything these days and, of course, the certified sanitary engineers will have to be upped to some more impressive status and title. It might be a phase of inflation. Diplomats, advertisers and politicians have euphemizing crews working night shifts and we all may have to learn a new language before long. It's elegant, but disquieting, when you consider that they probably will insist on blue-printing a leaky faucet before they apply, say, the lateral leverage which will denote a monkey wrench.

Mr. Fassler, a Tammany appointee of 1931, is a successful business man, head of the Fassler Iron Works. No Federal commission has yet reported on this, but it would appear that romantic business men have been responsible for word lacquering and glossing and substituting, rather than the professors.

Mr. Fassler is distressed because the word plumber suggests a "sorry-looking, dirty-faced individual carrying a tool bag." This writer has just finished building a new house. The plumbers didn't look a bit sorry—exultant, rather. On shift, they were smeared up a bit, but that seemed to cause no deep frustration; they seemed proud of their tool bags and let it be known what would happen to any so-and-so who messed around in them.

At any rate, Mr. Fassler feels sorry for the plumbers, whether they are sorry for themselves or not, and hands them a nice, shiny new word. As to the indignity of carrying a tool bag, the only thing to do is to call it an implement case and have it carried for the sanitary engineer by a man in sanitary white duck.

The late Sergt. Cram, back in the days of Murphy, coached Tammany sachems in social behavior, and helped them slick up their dress and their grammar. It was the beginning of quite a considerable overlay on the stripes of the Tiger. As to Mr. Fassler, he keeps a thousand workers inspecting New York buildings and things go on nicely with standard word kits in his offices. He started in the building industry, as a handyman in an iron yard, at the age of 13.

March construction in the 37 Eastern States totaled $231,245,900 according to F. W. Dodge Corporation. In February the figure was $188,257,300 while for March 1936 the total was only $198,761,900. Of the March 1937 figure $90,167,600 represented residential building; $88,601,500 went for non-residential building and $52,476,800 went into heavy civil engineering projects.

The March residential total was about 65 per cent. ahead of the total of $55,220,600 reported in this class for March 1936.

Residential building gains over March of last year were shown in each of the major geographic districts without exception. The most important increases occurred in the Chicago territory (Northern Illinois, Indiana, S. E. Wisconsin, Iowa); in Southern Michigan; in New England; in the Southeast; and in the Pittsburgh territory (Ohio, Western Pennsylvania, Kentucky, West Virginia).

Non-residential building gains over a year ago, where they occurred, were largely in private as distinguished from public jobs. Losses in total non-residential building from March 1936 were concentrated in the Southeast, Southern Michigan, the St. Louis territory, and Texas.

When Engr. Smucker was autoing back from the coast last summer, his trailer htich kept working loose and he had no wrench the right size to properly tighten it. In the sheep country in Wyoming he stopped at the first shack he had seen in 70 miles and asked its inhabitant, a smiling Swede, if he had a monkey wrench. The reply he received was, "I have got no monkey rench, I got sheep rench."

Previous to the Connecticut Engineering Congress last July, someone remarked in the hearing of Pauli Fotis, prominent Connecticut symphony leader, that the famous Dr. Steinman and Engr. Sacks had the leading parts in the program. Fotis promptly paid his $6.00 for two tickets and had a front table.

Afterwards he said, "The dinner was worth it, but I thought he was a premier sax player, so I was "scouting." I thought I might get him under a contract. Well if he could only play the Saxaphone as well as he can talk, what a man he'd be." His fellow scout remarked, "Yes, and that chap Sacks with him seemed too straight to be a sax even if they did say he was a lawyer."

Open Forum

Dear Editor:

Apparently New Jersey has the first Fees and Salary Schedule published by any of the State Societies for I am getting inquiries for copies from all over the country. Because of this fact, I believe it would be very valuable if you would publish our New Jersey report in THE AMERICAN ENGINEER and it will go a long way towards getting the other states to make up a similar schedule.

I want to extend my congratulations to you for the way in which you have improved the magazine and I believe your efforts are going to stimulate the interest of the Professional Engineer in our Societies. I believe your policy of publishing all of the minutes and news items, particularly of the individual State Societies, not so much the Chapters, is a good one because the individual engineer is most interested in our accomplishments and activities, much more than he is in reading technical articles and flowery papers, which he can find in any number of the technical magazines.

My thought is, THE AMERICAN ENGINEER should be the broadcast of all activities and accomplishments of the National and State Societies, particularly because it is only through advertising ourselves, that we are going to interest the Professional Engineers in our Society.

Very respectfully yours,

E. F. WEEKS,
Secretary-Treasurer,
New Jersey Society.

* * *

Colonel W. B. Tuttle, President,
Texas Society of Professional Engineers,
San Antonio Public Service Co.,
San Antonio, Texas.

Dear Col. Tuttle:

The appalling disaster at New London, Texas has aroused the horror of all the citizens of all the States in the Union, and I feel it my duty as Chairman of the Committee on Public Relations of the National Society of Professional Engineers to urge upon all State Societies of Professional Engineers, the necessity for coming to the fore in a prominent fashion protesting against the installation in school buildings of heating, ventilating or power equipment, except according to the plans, specifications, inspection and approval of qualified and registered Professional Engineers, and urge upon each State Society of Professional Engineers the adoption of a resolution to this effect.

I also urge upon the Legislative Committee of the National Society of Professional Engineers to prepare a Model Bill to be submitted to the different State Societies to present to their Legislatures to prevent a recurrence of this terrible catastrophe and horror which has startled the whole nation.

I enclose a proposed resolution for your consideration. I should be glad to receive your views upon this.

Yours sincerely,

HARRY E. HARRIS, *Chairman,*
National Public Relations Committee.

RESOLUTION

TO PROTECT THE LIVES OF HELPLESS CHILDREN AGAINST DANGERS CAUSED BY THE INEXPERIENCED OR POOR JUDGMENT OF THEIR ELDERS

WHEREAS, The recent horrible death of 450 helpless children in the avoidable explosion of the school house in New London, Texas, has shown the need of responsible direction to prevent a recurrence of such a catastrophe,

AND WHEREAS, Improper heating and ventilating systems in many existing buildings housing children are still a menace to their lives and health,

BE IT RESOLVED, That the ....Society of Professional Engineers do hereby propose that a law be enacted into the Statutes of the State of ..... that the heating, ventilating and power systems in all institutional buildings housing minors, including public or private schools, be inspected by competent professional engineers, qualified under the laws of the State by certification, registration or licensure, and that such changes be made as are recommended as necessary for the protection of life and health by such professional engineers, over their signatures and seals.

AND BE IT FURTHER RESOLVED, that all heating, ventilating and power systems, installed in such institutions and schools be made according to the inspections, specifications, plans prepared and approved by such qualified professional engineers.

Dear Editor:

I was much interested in looking over my copy of the February "AMERICAN ENGINEER" to learn that you are its Editor. That undoubtedly accounts for its improved appearance and better style. Congratulations!

The consistent use of the title "Engineer" by the National Society of Professional Engineers is new in the States but anyone who has travelled much in foreign countries, has learned that everywhere except in the United States, an engineer really is some one. Too long has the American who spends many busy years getting a technical education, usually as long as the average physician or lawyer, spent his time and money, only to go out in the world and find himself classed with a locomotive driver or a plumber. When one considers the importance of the engineer who builds safe bridges, who designs dams and highways, who constructs water and sewage plants which protect the lives of thousands of people he is actually doing more for humanity than the physician or the lawyer. Keeping people well benefits many more than the few who get ill and then need medical assistance to get well again.

Down here in South America it is entirely different. An engineer rates. In all of these Latin countries one soon finds that to add "Ingeniero" to ones name makes a big difference. You get better service in hotels, on trains, everywhere. You are a professional man entitled to the honors of your profession with equal standing with the physician and the lawyer. When you are introduced to someone you are presented as "Ingeniero So and So" and when anyone addresses you it is "Yes, Ingeniero" or "No, Ingeniero." Furthermore, having the title Engineer also gives you another, namely "Don." In other words you become "Ingeniero Don So and So." All your mail comes addressed to you as "Senor Ingeniero So and So." And why not? Perhaps if the general American public became more accustomed to the habit of giving the engineer his due he would become more resigned to paying him a reasonable fee for the work he does. One does not argue with the Doctor when ill, or the Lawyer, when faced with jail. Why then when one engages an Engineer to do a job which may entail the health or safety of many thousands of people should he haggle over the price the engineer feels he sould have for his work? If there is any reason in the old adage "The laborer is worthy of his hire" certainly that applies to the experienced engineer.

Down in all these countries engineers must be licensed especially if they are employed by the Government. They even go so far as to actually take your diploma and put a government seal and stamp on and scribble signatures all over it. It spoils the beauty of many of the higher works of "diplomatic" art but it certainly enhances their value.

And they have their active engineering societies down in these lands too. Each country has one and they have all recently formed a Federation, known as the USAI which so far has had one annual meeting attended by representatives from each country in South America. When one is to present a paper it is well publicised. The Centro Argentina des Ingenieros, which is the Argentine society, and of which I am a member, sends out printed invitations for the paper, here called a "Conferencia" and invites not only yourself but your family. Needless to say the family seldom comes but there is usually a good gathering. Most of these conferences are held at 6.30 P. M. as that is an off hour here between the dark and the daylight, when most people are thinking of leaving their offices but not of going home, as dinner is never until 9 or 9:30 and no one goes home until dinner time.

My work down here has kept me very busy but it has also enabled me to see many interesting things in the various countries of the Southern hemisphere. So far I have spent considerable time in Brazil, Uruguay, Paraguay, Argentine (which is my headquarters) Chile, Peru and Ecuador. My peregrinations take me closer and closer to Tierra del Fuego, (a land which when I was a schoolboy seemed the end of the world) but which I actually hope to visit in the near future.

Sometime when you are not too busy I will be glad to hear from you.

Sincerely,

E. B. BESSELIEVRE.

(Continued on Inside Back Cover)

NEWS OF STATE SOCIETIES

CONNECTICUT

Engineer President Allen Hubbard of the Connecticut Society of Professional Engineers under date of April 26th appointed the following members of the Connecticut Society to serve upon the Legislative Committee:

Engineer. Harry E. Harris, Chairman, 229 Thorne Street, Bridgeport, Conn.; Engineer John W. Shallenberger, 886 Main Street, Bridgeport, Conn.; Engineer Laurence Fisher, The Siemon Co., Bridgeport, Conn.; Engineer John L. Harkness, 1077 West Broad St., Stratford, Conn.; Engineer Albert W. Hagan, 95 Waterman St., Bridgeport, Conn.; Engineer Allen Hubbard, 1109 Chapel St., New Haven, Conn.

Engineer John W. Shallenberger was also appointed as the Representative of the Legislative Committee to serve as a member of the State Board of Directors of the Connecticut Society of Professional Engineers, since the Chairman, Engineer Harris, as the immediate past-president of the Society, is automatically a member of the State Board of Directors.

The Alternate Representative of the Legislative Committee named was Engineer Laurence Fisher.

A very successful entertainment and social was held under the auspices of the Connecticut Society of Professional Engineers, Inc., in the large Ballroom of the Stratfield Hotel in Bridgeport.

President William P. Little of the Bridgeport Chapter was Chairman of the Committee on Arrangements. Fourteen hundred and sixty-one invitations were sent out by the Committee to all parts of the State of Connecticut and there was a total attendance at the affair of four hundred and seventy-seven. The Committee produced a program which was a well-balanced combination of science, amusement and refreshments.

The Jenkins Bros. Co., who manufacture the Jenkins Bronze, Iron and Steel Valves, exhibited a very splendid talking motion picture which fully described the art and detail methods of manufacturing a high-class valve. This film showed the testing machines, methods of gauging, in fact, showed the entire process of manufacture from the chemical processes, the actual melting and pouring of the alloys, on through the various precision operations until the final assembling and check-up inspection. This film was very well directed and ranks high technically.

The program started with a speech of welcome from Chairman Little who introduced Mr. Lou H. Serre, Vice-President of the Jenkins Bros. Co., who explained that while the film entitled, "A Fair Offer," might be considered as an advertising film, he felt that its technical value justified its being shown on an occasion of this sort.

Comic songs and ballads were rendered by Joe McKenna, comedian, Al Jersey, tenor, a comedy trio by Sailor Muggins, G. Carpenter and Pal, and by William Goldemen who also acted as Master of Ceremonies.

Billy Corrigan, famous boy soprano, sang three selections and an unusual dancing act was demonstrated by Frank Velky and Pat O'Day with their companions.

Marcelle Murzyn gave a surprising demonstration of her abilities as an accomplished songstress.

The stage entertainment was closed by the Delvy's Streamliners, Bill Salzman and Johnny Tickey, in a thrilling but almost unbelievable breath-taking exhibition of fancy acrobatic roller skating.

Refreshments were then served and a very enjoyable social get-together and smoker followed.

JOHN L. HARKNESS,
Secretary,
Bridgeport Chapter,
Connecticut Society of Professional Engineers, Inc.

DISTRICT OF COLUMBIA

Led by Joseph Barnett, chairman of their legislative committee, the Washington branch of the National Society of Professional Engineers, last night demanded that District engineers be raised above the professional "level of barbers."

This can be done, it was stated, only by the passage of a pending House bill which would force all local engineers to be registered by a duly authorized board.

In rallying his brother engineers to the support of the bill, Barnett, drawing examples from medicine, dentistry and law, declared "our profession, too, must be disciplined. Legislation providing such "discipline" is in effect, it was shown, in 35 States.

The bill, referred by the House District Committee to the Board of Commissioners, defines a qualified engineer as a person who has been graduated from an approved school, who has had four years of active practice in engineering work, and who succeeds in passing a written examination.

The bill, if passed, it was claimed would safeguard life and property in the District.

A petition in support of the bill is now gathering the names of District engineers. It soon will be presented to the Commissioners, for, said Barnett, "without their help the bill cannot succeed."

KENTUCKY

Annual Meeting April 23-24, 1937

FRIDAY, APRIL 23, 1937

10:00 a. m.
Registration—South Room, Mezzanine Floor.

10:00-12:00 a. m.
Get-together—South Room, Mezzanine Floor.

12:00 noon
Luncheon—South Room, Mezzanine Floor.

1:30 p. m.
Inspection Trips. (Busses to leave from the Broadway entrance of the Brown Hotel promptly at 1:30 p. m.)

TRIP 1

Commissioners of Sewerage.
Point Sewerage Pumping Station.
Louisville Gas & Electric Co.,
Beargrass Gas Plant.
Louisville Water Company,
Pumping Station, and Filtration Plant.
Elevated Crossing Project.

TRIP 2

Southern Bell Telephone Co.,
Automatic Exchange.
Louisville Gas & Electric Co.,
Hydro-Electric Station, and Waterside Steam Station.

6:30 p. m.
Annual Dinner—Roof Garden.
Welcome—James B. Wilson, Chief Engineer, City of Louisville Department of Public Works.
Address — "Highway Transportation," Thomas H. Cutler, Kentucky State Engineer, Department of Highways.
Address — "Modern Finance," Milton Trost, Resident Partner, Stein Bros. & Boyce, Chicago, Ill.
Address—"The Engineer and the Lawyer," George W. Meuth, Regional Counsel, Public Works Administration.
Appointment of Special Committees.
Election of Officers.

* * * * *

SATURDAY, APRIL 24, 1937

10:00 a. m.
Business Meeting—Roof Garden.
Reading of Minutes.
President's Report.
Treasurer's Report.
Reports of Standing Committees.
Unfinished Business.
New Business.
Reports of Special Committees.
Induction of Officers.

12:00-1:25 p. m.
Luncheon—Roof Garden

1:30 p. m.
Inspection Trip 3. (Busses to leave from the Broadway entrance of the Brown Hotel promptly at 1:30.)
Commissioners of Sewerage,
Mill Creek Project.
J. E. Seagram & Sons Co.,
Seagram's Distillery.
Public Works Administration,
18th St. Housing Project.
Public Works Administration,
7th St. Housing Project.

NEW JERSEY

NEW JERSEY ASSOCIATION OF PROFESSIONAL ENGINEERS AND LAND SURVEYORS

FINAL REPORT

of

Committee on Salaries and Charges for Engineering Services

1937

B-1—Percentage of Cost.
B-2—Fixed Lump Sum Fee and Land Surveying Fee.
B-3—"Per Diem" Rates.
B-4—Salary for Part Time Service.
B-5—Retaining Fee.
B-6—Contingent Fee.

(A)—SALARIES

In the latter part of 1933, following the establishment of the Public Works Administration and the Civil Works Administration, representations were made by engineering societies to the Washington authorities to the effect that the salaries of Engineers were not sufficient on some of these works, in

proportion to the salaries and wages of others employed on the works. It was pointed out by the Washington authorities that there was not a standard set-up of salaries approved by the engineering societies. There was therefore formed the "Metropolitan Regional Committee on Engineers' Employment and Salaries," which body was made up of representatives of some twenty-one national and local engineering societies. This committee made a report as of June 20, 1934.

It was thought advisable by your committee to follow the recommendations of the Metropolitan Committee concerning salaries. The report of the Metropolitan Committee was therefore followed in this report with the exception that the educational requirements set forth in the report of the Metropolitan Committee are not mentioned in this committee report.

GRADE 1. ENGINEERING ASSISTANT

Duties: Under immediate supervision, to assist on engineering work in field or office; make simple measurements and sketches; make and check simple computations; make tracings and simple drawings from sketches and record plans; do neat lettering of various forms; assist in the compilation of engineering data; assemble and file engineering plans, specifications, and records; perform the usual work of a rodman, chainman, tracer or Junior draftsman.

Salary: $30 to $50 per week.

GRADE 2. JUNIOR ENGINEER.

Duties: Under supervision, to perform technical work in the office or field requiring a knowledge of engineering practices and methods; make working drawings and designs and prepare estimates; make computations of a technical character; perform minor surveys and construction inspection. This classification includes the position usually called Levelman and the lower grades of Draftsman and Inspector.

Salary: $40 to $60 per week.

GRADE 3. JUNIOR ASSISTANT ENGINEERS

Duties: Under supervision, to take charge of a field party, a drafting squad, or inspection of construction; to make and check quantity and cost estimates; to lay out work and draw plans and detail drawings; to check working drawings and fabricator's details; to keep records; to make reports. This classification includes the high grades of Draftsman, the position usually called Transitman, Engineering Inspector, Detailer, Checker, Squad Boss, and Chief of Party.

Salary: $50 to $75 per week.

GRADE 4. ASSISTANT ENGINEER.

Duties: To perform important engineering work in office or field requiring the exercises of independent engineering judgment and skill; to make studies, estimates and reports; to prepare designs and specifications; to supervise the work of draftsman, or field parties or a group of inspectors on construction work. This classification includes the position usually designated as Designer or Designing Engineer.

Salary: $75 to $150 per week.

GRADE 5. ENGINEER.

Duties: To be in resposible charge of a minor engineering organization or to have immediate administration and technical charge of a division (comprising several squads or parties in office or field) in a large organization; to plan, direct and supervise the design or construction of engineering projects; to supervise the preparation of engineering, construction and business operations of his division, bureau, section or department; to have immediate responsible supervision of the work of draftsman designers, and assistant engineers. This classification also includes the positions usually designated as Resident Engineer and Section Engineer.

Salary: $100 to $200 per week.

GRADE 6. ASSISTANT CHIEF ENGINEER.

Duties: To be in responsible professional and executive charge of a major division of work on a large engineering project, involving planning, designing, and supervision of construction; to give independent, critical engineering advice for executive action incidental to such work; to assume professional and executive responsibility for the whole of a smaller engineering project. This classification also includes the position usually designated as Division Engineer and Senior Engineer.

Salary: $150 to $300 per week.

GRADE 7. CHIEF ENGINEER.

Duties: To have entire charge of and be responsible for entire organizations comprising more than one engineering division and engaged in more than one class of work; to determine and establish technical and administrative policies and procedure; to be responsible for all engineering design, construction and business operations; and to investigate all engineering projects submitted for consideration and report critically regarding feasibility, cost, economic justification, and public necessity of convenience.

Salary: $250 to $1,000 per week

In the fall of 1933 and the early part of 1934, a "Committee on Salaries" of the American Society of Civil Engineers investigated present salaries now being received by engineers and engineering assistants.

A report was made as of July 10, 1934, giving the salaries received on the average throughout the United States. The report mentions certain regional factors which should be used in the given salary list, reducing or increasing same, depending on location.

In the following list the salaries now received are shown for the Middle Atlantic States, being New York, New Jersey and Pennsylvania. There is also shown the recommendations of the Metropolitan Regional Committee as above described.

Grade			
1. Engineering Assistant	$ 26.5	$ 30 to	$ 50
2. Junior Engineer	35.8	40 to	60
3. Junior Assistant Engineer	44.2	50 to	75
4. Assistant Engineer ..	57.5	75 to	100
5. Engineer	77.4	100 to	200
6. Assistant Chief Engineer	101.7	150 to	300
7. Chief Engineer	134.9	250 to	1,000

It may be seen in the above that the salaries now being received in Classes 1, 2, and 3 are about 90% of the minimum recommended salaries. In classes 4 and 5 they are above 77% of the minimum. In class 6 they are about 68% of the minimum. In class 7 they are about 54%.

RECOMMENDATION: It is recommended that the listing of salaries as per recommendations of the Metropolitan Regional Committee be adopted as the salary basis for New Jersey. It is felt that some percentage of decrease should be made in the minimum salary listings, the same to be effective only until March 1936, at which time the New Jersey Association of Engineers may act further on the matter. It is therefore recommended that the following salary listings be established at this time and up to March 1936, as being proper salaries for engineering services in New Jersey.

Grade	Salary
1. Engineering Assistant	$ 27 to $ 50
2. Junior Engineer	36 to 60
3. Junior Assistant Engineer ...	45 to 75
4. Assistant Engineer	60 to 150
5. Engineer	80 to 200
6. Assistant Chief Engineer	120 to 300
7. Chief Engineer	160 to 1,000

(B)—CHARGES FOR ENGINEERING SERVICES AND METHODS OF COMPUTING SAME

A special committee on fees of the American Society of Civil Engineers made two reports in 1930, entitled "Manuals of Engineering Practice" numbers 5 and 6. Both cover the same ground, except that No. 6 is prepared for the use of clients, whereas No. 5 contains much more material and is for the use of the Engineer himself. The matters included in the various methods of charges and those excluded are set forth in detail in these reports.

Seven methods of making charges are set up in these reports, and some portions of the reports are used herein.

B-1—PERCENTAGE OF COST.

The following recommended rates include preliminary studies, investigation and report on the project; preparation of plans; estimates of quantities and cost; specifications; award and execution of contracts; supervising and laying out of the work by the principals; computations of estimates; consultation and advice to Client during constructions, including also general direction of the work to its conclusion. They do not include resident supervision; shop or field inspection of materials or construction; assessment maps; purchasing or management; borings, soundings, tests, analysis, and costs incidental to such matters. In frequent cases there should also be an additional charge for preliminary surveys, studies and reports.

The recommended schedule of minimum rates is as follows:

Net Cost of Works	Percentage of Cost as Minimum Rate for Charges
Less than $ 10,000	10%
$ 10,000 to 25,000	10% to 9½%
25,000 to 50,000	9½% to 8%
50,000 to 100,000	8% to 6½%
100.000 to 250,000	6½% to 5½%
250,000 to 1,000,000	5½% to 4½%

If the construction work is in a number of separate contracts or is of a very intricate or highly specialized character, the rates are to be increased. If the construction work is of a very simple character the rates may be reduced.

Payments on account to be made as follows:

Payment upon submission of preliminary report, 30%.

Payment upon submission and approval of plans and specifications, a total of 70%.

Balance of payments to be made monthly as work progresses to reach, upon completion of work 100%.

"CHAPTER SCHEDULE"

NO CHANGE FROM THE BAUER REPORT.

On highway and road work for municipalities, where the State highway commission participates in the cost of construction and of engineering fees, the above schedule of fees, based on percentage of cost, is to obtain. However on the class of work, where the project costs less than $10,000 per mile, the fees are to be not less than $750 per mile for engineering services.

B-2—FIXED SUM FEE AND LAND SURVEYING FEE.

The Lump Sum Fee for engineering charges is sometimes used. It enables a Client to ascertain in advance the cost of engineering services, but it introduces difficulties and unfairness to the Engineer or to the Client if the original project is increased or diminished in size or if the work is carried over to longer period than at first contemplated. Therefore in service of this kind, the agreement should provide:

(a) For payment for services beyond a specified period of time.
(b) For additional payment in case the original project is expanded.
(c) For reduction in payment in case the conditions are the reverse of those described above under (a) and (b).

The Lump Sum Fee Method of payment is approved. The fee is to be based on the percentage of cost as shown in B-1 herewith, upon carefully estimated cost of the project.

Fixed lump sum fee charges may also be made for special classes of engineering services, as consultation, arbitration, professional advice expert testimony, valuations and appraisals, materials and efficiency tests, reports and design.

Fixed lump sum fee charges or fees for land surveying is a method of compensation usually followed in the surveying of small lots and parcels of land frequently in larger operations. The fees for such work to be determined by the various county chapters.

"CHAPTER SCHEDULE"

TABLE OF MINIMUM RATES FOR SURVEYS

Lot Survey.

A lot survey is a survey made to identify the record line by stakes and marks on the ground. It includes a plan showing the relation of the record lines to the marks and stakes. A lot is considered to be not more than fifty (50) feet front by one hundred (100) feet in depth.

Location Survey.

A location survey is a survey made for the purpose of showing the improvements on the premises, and the relation between possession and the lines of recorded title or lines of reference. This survey does not include any physical marks for finding said lines on the ground. The lot is considered to be not more than fifty (50) feet front by one hundred (100) feet in depth.

CHARGES FOR COMPLETE LOT SURVEY.

Business Lot.

A business lot to be charged for at double the rate for residential lots. In no case to be less than $50.00.

Residential Lot.

Residential lots not exceeding fifty (50) feet front by one hundred (100) feet in depth —$25.00.

An extra charge will be made for lots of more than four sides and for lots on curved streets.

Five Dollars ($5.00) additional will be charged for each additional adjoining fifty (50) feet by one hundred (100) feet, or fraction thereof.

For staking buildings a charge of Two Dollars ($2.00) for each stake if stakes are driven at time of making survey of lot.

CHARGES FOR LOCATION SURVEYS.

Fifty (50) feet from by one hundred (100) feet in depth, or less—$20.00.

Five Dollars ($5.00) additional will be charged for each additional adjoining fifty (50) feet by one hundred (100) feet, or fraction thereof.

Group Buildings.

Location Surveys on Adjoining Staked Lots.

Twenty Dollars ($20.00) for first lot plus Ten Dollars ($10.00) for each adjoining additional lot.

Acreage Surveys.

Acres	Acres		Balance Per Acre
1 to 40	1st acre	$ 40.00	$10.00
40 to 60	1st 40	430.00	8.00
60 to 80	1st 60	590.00	6.00
Over 80	1st 80	710.00	6.00

B-3—"PER DIEM" RATES

The per diem basis of computing professional fees is well adapted to work involving —irregular personal service and is quite generally used.

Charges for expert testimony and court work will vary greatly according to the character of the work involved. The following rates are recommended.

In court work two classes should be observed in charges, as follows:

(a) Per diem for court attendance, $30 to $100. The full per diem rate is payable for a day or any part of a day that attendance is required in court whether or not the witness testifies.

(b) Per diem rate for preparation for case and conference with Counsel or Client $30 to $50. The per diem rate is payable for days or parts of days when the Engineer is preparing the case or is engaged with Counsel or Client, in the preparation of the case.

Per diem rates also apply to many classes of special engineering service, as consultation, arbitration, professional advice, valuations and appraisals, materials and efficiency tests, reports and designs.

It is recommended that for these various classes of service the following named charges prevail, the same to be fixed in accordance with the value of the service.

Per Diem Rate, $30 to $100.

The per diem rate of compensation also applies to many classes of work carried on in field and office, chiefly land surveying work and the drafting and computing in connection with same.

The per diem and hourly rate for field surveying, drafting, computing, etc., to be determined by the various county chapters.

"CHAPTER SCHEDULE"

Field Rates.

Field party of two men $50.00 per day, and for each additional man $15.00 per day.

Office Rates.

Office rates. $5.00 per hour, no less than $30.00 per day.

Minimum charge for party for field work regardless of shortness of time—$20.00.

A minimum of $25.00 per day or fraction thereof shall be charged for Court Attendance.

B-4—SALARY FOR PART TIME SERVICE.

This method of compensation is used very largely by municipalities in the employment of engineering services, but does not apply to engineers employed on a salary basis for full time service. The method is also of value at times in furnished private service.

Every public body employing part time engineering service on a unit basis should set up a definite sum in salary or the engineer for the year. This sum would be variable depending upon the size of the municipality the prospect of work involved, probable necessity for attendance at meetings and importance of the projects.

The salary thus paid to cover attendance at meetings, general preliminary advice, correspondence, etc. Such salary is to be an addition to regular engineering fees such as may be agreed upon under methods B-1, B-2, and B-3 as herein described.

B-5—RETAINING FEES.

The employment of a retaining fee as part payment for engineering services is recommended. This would be a fee set up for preliminary consultation and advice with and by the engineer in relation to a proposed construction operation.

If the project matures and construction is carried on, the retaining fee may be absorbed into the general total payments for engineering service.

B-6—CONTINGENT FEE.

This method of computing compensation is not recommended. It is difficult to compute compensation for professional service contingent on the benefits which may accrue therefrom.

NEW YORK

The New York County Chapter New York State Society of Professional Engineers held its spring meeting Tuesday, May 4, at the Columbia Club, 4 West 43rd St., New York City. Chairman, E. H. Praeger. "Queens Mid-Town Tunnel," by Ole Singstad, Chief Engineer N. Y. Tunnel Authority. "Engineering Legislative Developments," by David B. Steinman, Past President, National Society of Professional Engineers.

A dinner preceded the meeting. H. R. Towse, President; Benjamin Ettelman, Secretary.

Engineer Ole Singstad is one of the most prominent tunnel engineers of the profession. He has been connected with many of the most important tunnels both in this country and abroad. He was connected with the Holland, Detroit, and Mid-Town Tunnels in New York City, as well as the present East River tunnel in this country. He was called in consultation by the Belgians on the River Shelde Tunnel, at Antwerp and on the tunnel under the Mersey River which runs from Birkenhead to Liverpool.

Dr. Steinman is well known to all of us.

Engineer Emil Preager is the Chief Engineer of the Consulting firm of Madigan and Hyland. He is a graduate of Rensselaer Polytechnic.

Our new President of the Chapter Engineer Harold R. Towse, a graduate Mechanical Engineer, from Stevens Tech in Hoboken, N. J., has given great evidence of industry since he has taken over the reins and has instituted many changes which will undoubtedly benefit the profession. He has appointed many committees and given the chapter a new lease on life. New York Chapter will in the future bear watching.

The Annual meeting of the New York County Chapter of the New York State Society of Professional Engineers was held at the Columbia Club, New York City, in March. The following officers were installed for the coming year:

President, Harold Rankin Towse; Vice-Presidents, Emil Preager, Adolph C. Syska, H. S. Rommele, Walter E. Bradley and Henry C. Enders; Treasurer-Secretary, William Henry Yates; Directors (2 years), Homer C. Balcom, Walter E. Bradley, R. A. W. Carleton, Malcolm Curry, Edwin A. Kingsley, Wm. John Krefeld, Geo. J. Nicastro, John W. Pickworth, George A. Sallans and Walter H. Weiskepf.

After reports were read by the chairmen of the various committees the retiring President John W. Pickworth introduced as guest speaker the Past President of the National Society of Professional Engineers Dr. D. B. Steinman who spoke upon the legislation pending before the New York State Legislature. Many Bills were read which were acted upon favorably while a number of Bills which either were not beneficial to Engineers or detrimental were voted "to oppose their passing." The Secretary was instructed to write the various Majority and Minority Leaders of the major political parties regarding the Chapters' actions on the various pieces of legislation.

As usual Dr. Steinman, who has devoted considerable time to the Professional movement, gave one of interesting talks which was well received by his listeners who numbered about seventy.

Professor W. J. Krefeld, a Past President of the Chapter, and Head of the Testing Laboratory of Columbia University gave a most interesting talk on "Fire Protection." Professor Krefeld told his audience about the many tests his department had made in conjunction with the New York City Fire Department to determine the "Fire Resisting" ability of many of the materials now used in the construction industry. The high light of his talk was in conjunction with the showing of a short film showing the action of glass building bricks under a fire test. In short his listeners were appraised of the recent development of the fire resisting methods now in vogue in the building industry in New York City.

The Directors of the Chapter appointed as the new secretary of the Chapter for the coming year. Engineer Benjamin Ettelman, who is a graduate of Lehigh University and is at present connected with the Delaware Water Supply Project of the City of New York.

Details of the New York State Chapter Annual Meeting will be found in the June issue.

Officers and Directors of Erie County Chapter of the New York Society of Professional Engineers were recently elected as follows:

President, J. Leo Scanlon, 487 Ellicott Square, Buffalo, N. Y.; Vice-President, Elwin G. Speyer, 422 Crescent Avenue, Buffalo, N. Y.; Treasurer, Arthur B. Weaver, 140 Winspear Avenue, Buffalo, N. Y.; Secretary, Michael D. McDonald, 284 Knowlton Ave., Kenmore, N. Y.; Directors, Edward F. Metz, 36 Maynard Ave., Eggertsville N. Y.; Stewart S. Neff, 348 Girard Avenue, East Aurora, N. Y.; Stephen E. Preble, 271 Delaware Avenue, Buffalo, N. Y.; William T. Huber, 95 Winston Rd., Buffalo, N. Y.; Lorin W. Barger, 30 Cayuga St., Lancaster, N. Y.; August C. Smith, 1100 Electric Bldg., Buffalo, N. Y.

The 167th meeting of the New York State Board of Examiners of Professional Engineers was held at the American Society Civil Engineers headquarters in New York City in three all-day sessions on Friday, Saturday, and Sunday, April 9, 10, and 11.

The Board considered and approved the ratings, reported by the Board members, of 603 candidates at the February 1937 examinations, and conditioned 85 applicants, rejected 41 who failed in more than one examination, and passed 477.

The Board interviewed 49 applicants and of these rejected 20, held 13 for written examinations, and approved 16.

Also, at this three-day meeting, the Board considered 1166 applications on the basis of prior review of these applications by the individual Board members and a comparison and discussion of their respective recommendations.

Of the total number of 1818 applications considered at this meeting, 396 were scheduled for written examinations, 326 were rejected, 130 were held for further consideration, and 966 (including those who passed the February examinations) were approved for license.

All of the applications considered had been filed prior to January 1, 1937. There still remain over 2500 such applications to be considered before the July 1937 examinations. Applications filed after January 1, 1937, will not be reached in time for assignment to the July examinations, which will be held on July 5, 6, 7 and 8, 1937.

The next meeting of the New York State Board will be held at Buffalo, on May 7 and 8.

PENNSYLVANIA

PENNSYLVANIA SOCIETY OF PROFESSIONAL ENGINEERS
PITTSBURGH CHAPTER
THE PLACES WHERE

Regular Meeting Pittsburgh Chapter, 8:00 P. M., May 20 in the Assembly Room

at Fort Pitt Hotel. A la carte dinner in the Coffee Shop at 6:30 P. M. The Guest Speaker—Judge Gray, Common Pleas Court, Allegheny County—Subject:—"Scientific Treatment of the Crime Problem."

EDITORIAL

The Pittsburgh Chapter welcomes the following new members: Engineer Thomas B. McKean and Engineer Burford A. Organ.

Individual Engineers make up the Chapter. YOU are one of these individuals. Have you contributed anything this month? Have you paid your dues for the year?

Don't expect some one else to pass your laws in the Legislature. If you want them passed, work for them.

There are three proposed laws in which Engineers should be interested, two at Harrisburg and one at Washington.

"Architects and Engineers Joint Act," see page 20, February AMERICAN ENGINEER.

"Co-ordinate Systems for Pennsylvania," see page 15, January AMERICAN ENGINEER and Bulletin you have received or may obtain from the Secretary.

"Registration of Engineers in the District of Columbia."

THE AMERICAN ENGINEER needs your support. The sinews of war for IT, are advertising and *more* advertising. The advertising quota for Pennsylvania is one-half page. "Fellas," we ought to be able to dig up a page in Pittsburgh alone. How about it? "Let's Go."

IT COMES UP HERE

Engineer Robert Hall Craig, Harrisburg, has been named by Governor George H. Earle, one of five men to represent Pennsylvania at the National Stream Control meeting at Washington. The other members are J. F. Bogardus, State Secretary of Forests and Waters; A. M. Oppenheimer, Pittsburgh, Member of the Tri-State Authority; William B. Rodgers, Pittsburgh, President of U. S. Flood Control Federation and Edward L. Weikert, Jr., Gettysburg.

The Fort Pitt Management supplied extra rolls for dinner last meeting night. Engineer Aires was scouting the foot of the table for choice side dishes but Engineer Cartin took no chances. He ate at home.

We hope Engineer Purchard, Patent Attorney, will give us the latest device on how to get new members.

On Friday, April 3, 1937 at the Annual Meeting of the Pittsburgh Affiliated Technical Societies, The Pennsylvania Society of Professional Engineers, was elected to membership of this organization. This culminates the tentative approval of our membership.

Eng. Hutchinson is thinking about organizing a military setup in the Chapter; Maj. Blakeslee, Capt. Quick, Capt. Price, etc. We wonder where he will get the soldiers?

Eng. Battin, Secretary of the State Society advises us Pittsburgh Chapter is leading the State in new members obtained. Let's keep our record up. We are glad to report that our Chapter is making remarkable progress, and has already assumed an outstanding place among Engineers. The meetings have been well attended, and have been made interesting by excellent speakers.

Engineer Perkins of Langhorne, Pa., advises, it is wisdom not to "swap" horses in the middle of the stream, and this applies to overcoats on rainy nights. It could not be possible Engineer Keller was confusing Leghorn with Langhorne and coats for hats. For his information Langhorne is in Bucks County, Pa.

Eng. Ross, Chief Editor of *Allons* requests the help of a photographer. Please apply at Allons Bldg. between 12 and 1 P. M. By the way who is the gifted Frenchman who thus named our Bulletin?

Eng. George S. Richardson is conducting a series of lectures, sponsored by the Cement Association describing a new method of computing bending moments. Eng. Richardson is presenting this data very clearly. The closing talk will be held, Thursday evening, April 29th in room 104 Mechanics Hall, Carnegie Institute of Technology.

If your copy is not published this time it will be the next. Please send all contributions to Eng. Ross, 309 Fourth Avenue. We accept poetry—if you can write it.

The Pittsburgh Chapter will send three amendments to its membership for ballot in May.

1. Clarifying general membership requirements.
2. Making the term of office of Vice-President one year instead of two years.
3. Making the Ethics and Practice Committee membership not contingent on membership of the Board of Directors.

On April first the Chapter will begin its first publication. Its title will be *Allons*.

Doctor Robert E. Doherty, President of the Carnegie Institute of Technology, will be guest speaker at the April fifteenth meeting of the Chapter. "The Engineering Profession" will be the subject.

The following Engineers have joined the chapter recently:

Engr. Jerome Jackson, Engr. S. H. Burns, Engr. Sidney A. Martin, Engr. Samuel D. Foster.

The State Registration Board advises us that the following Engineers have registered as of March 3rd, in this district:

Engr. Burford A. Organ, Engr. Fred. Jernberg, Engr. Paul W. Davis, Engr. David H. Diehl, Engr. George M. Levinson, Engr. Louis T. Shannon, Engr. Robert C. Graham, Engr. Wm. H. R. Kreiling, Engr. Leo J. Vogel.

NATIONAL SOCIETY NEWS

(Continued from page 5)

I shall be grateful if you will follow this through and advise me promptly of further developments.

I have not heard whether the Governor of Georgia has signed the bill, but I assume that he has.

Faithfully yours,
D. B. Steinman.

Dean S. S. Steinberg,
University of Maryland,
College Park, Md.

Dear Dean Steinberg:

I have been pleased to learn of the recent address by Engr. Willard S. Conlon on "Engineering Registration Laws" before your engineering classes, making the University of Maryland one of the first institutions to give its students an opportunity to become familiar with the professional engineers' licensure, philosophy and procedure. I want to take this opportunity of recording the grateful appreciation of the National Society of Professional Engineers for this interest and courtesy you have extended, and of complimenting you and your Faculty on your progressive attitude toward registration.

The engineers of Maryland are fortunate in having the benefit of your progressive leadership. I trust that the opportunity may develop for you to take a leading part in establishing a Maryland Society of Professional Engineers.

With sincerest regards.

Faithfully yours,
D. B. Steinman.

Excerpts from a bulletin issued to members of The Engineers' Association of Dublin, showing the trend of engineering activities in that organization.

CUMANN NA nINNEALTOIRI
(The Engineers' Association.)
23, Grafton Street,
Dublin.

Dear Sir:

At this, the commencement of a new year, the Council of Cumann na nInnealtoiri (The Engineers' Association), has instructed me to communicate with its Members reminding them of the objects of the Association, viz: to improve and advance the status and remuneration of qualified Members of the Engineering Profession in Ireland.

Since its inauguration in 1928 the Cumann has endeavoured to educate successive governments and the general public on the desirability of protective legislation (i. e. Registration of Engineers) for qualified Engineers, so that on the one hand such Engineers will receive due recognition and remuneration and proper conditions of employment, and on the other that the public will be safeguarded against the unqualified practitioner, who as a self-styled Engineer, brings contempt and ridicule on the Profession.

The Cumann has kept a watchful eye on he financial and other important interests of the Engineer and has protested in the strongest terms against the exploitation of its Members, whether this exploitation was associated with Government Departments, Local Government Services, Government Boards or private employers. As proof that such watchfulness is necessary one need only instance the treatment meted out to Engineers in the Sugar Co., and the Turf Development Board and to remind those more fortunate, who, so far, have not experienced harsh treatment, that their turn may be next. No salaried employee can afford to blind himself to the possibility that no matter how good his position or prospects may be now, the day may arrive when, owing to lack of a strong protective organization, he will be the victim of a similar injustice. The Association has also taken up the question of salaries and conditions with Local Bodies who have offered to fully qualified and experienced Engineers, salaries and conditions which, in some cases were not even equal to those applicable to foremen and artisans.

My Council sees no reason why the legitimate claims of the Association, as regards recognition and status, cannot be obtained if all qualified Members of the Engineering Profession in Ireland, be they Civil, Electrical or Mechanical, come together as Members of one Profession. My Council addresses itself to those proud of the profession, proud of its services and responsibilities and jealous of its tradition.

I am also to inform you that your Council is at present interested in studying the question of the formation of a Guild of Irish Technologists to look after the general interest of qualified technical men in all branches of technology.

Yours faithfully,
CHARLES HOLOHAN,
Secretary.

ENGINEERING AIMS AND IDEALS

(Continued from page 13)

an organized character is continually necessary if the profession of engineers is to perform properly its duties and maintain its prestige. I shall state briefly some things which I think should be major objectives of your organized profession.

1. *The requirement of adequate education and character for admission to your profession.* The members of your profession owe a duty to the public to see that those who become engineers are adequately equipped by education, training, background, and character to perform in a competent and honest way the complex and difficult tasks which your profession is called upon to solve. The unprepared and unfit must be kept out of your profession. Much indeed has been accomplished toward this end, but I do not believe that all that can be done has been done in this direction.

2. *The driving of the unscrupulous and unfit out of the profession.* In your profession, as in mine and all others, there are some who lack ethical standards and the traditions of competent and honest work for their employers. Whenever an employer is betrayed or poorly served by one of these unworthy members, the whole profession suffers. I think therefore that organizations such as yours should seek the responsibility and the power to drive out of the ranks of your profession those who have proved to be unworthy and who tend to bring the whole profession into disrepute. The task is one for state organizations giving effect if possible to nation wide standards.

To prevent the admission of candidates unprepared by education, background, or character, and to insist rigorously upon the exclusion of those who have revealed their unfitness are dual responsibilities of your profession.

3. *The protection of the public against the doing of engineering work by unauthorized or untrained persons.* This objective is of course closely related to the previous ones. But in every community there are men who call themselves engineers and who attempt to do engineering work, who have not had the training or experience of engineers. The public is entitled to have its work done by trained and responsible engineers. Engineers as well as the public should demand that the law which prohibits anyone from practicing engineering who is not registered should be obeyed and enforced.

4. *The giving of advice and help to young engineers.* In these days of unsettled business conditions, when great sums are being expended by the government for the relief of the poor and the unemployed, there is apt to develope among the young men being graduated from school and coming into your profession a feeling that in some way the public, the profession, or the government, owes them a living from the start, without the necessity of self discipline or very much hard work.

This presents a problem of adjustment and placement which must be dealt with intelligently by your professional organizations. Otherwise many of these young men will become advocates of a socialized profession with all of its sinister implications.

I do not know whether your profession has ever been an easy one or that it has ever yielded great compensation to the beginner. I do not know that there are coming into all professions today men who are not gaited for the long race and who want a better deal from the start without working or waiting for it.

5. *The post graduation education of engineers.* There is perhaps no profession in which the need for a continued education is greater than that of engineering. The discoveries in science are so numerous and important that an engineer who does not familiarize himself with them will soon find that his learning is antique and his technique is obsolete. Yet, I doubt, whether in your profession, any more than in mine, any systematic scheme has been developed for the post graduate training of engineers.

The importance to your profession and to the public of this post graduate education is so great, that it seems to me that, of organizations like your own, it should be a major objective.

6. *The establishment of nation wide standards and organizations.* The accomplishments of the objectives which have been enumerated cannot be effectively or completely effectuated through local or even state organizations. There must be national standards and national organizations. Each local and state organization can do its part and render effective aid, but that is not enough. An effective national organization enforcing national standards is necessary. In the task of making such an organization feasible and effective the experience of the American Medical Association may be studied with great advantage.

I hope you will not think that I have been presumptious or impertinent. I have not the right or the ability to dictate the scope, the ideals or the objectives of your organization. I look forward with hope and confidence toward a bright future for your organization and for the great profession of which it is an eminent representative; and today I have simply stirred some points in order that wiser heads may settle them.

ENGINEERS AND TOMORROW

(Continued from page 16)

results of their discoveries and inventions and the ultimate influence of these achievements on human life. It is for this reason that I have urged all engineering schools to consider the feasibility of providing their curricula, as a few have already done, a broad training that will give to their students an understanding of the fundamentals of economic and other social problems to guide them in their applications of engineering technique."

Such are the comments of one who seemingly envisions the engineer of tomorrow more graphically than does the latter himself. The hopes of the President and the objectives of the professional society movement are identical. The latter is determined to make possible the engineer who will tomorrow be called on to direct humanity.

The National Society, and its autonomous confederated state associations, regards the licensing machinery as the one agency that can reasonably assure society of an engineer whose character, professional and social qualifications have been examined and attested to and which can establish for the engineer that respect and recognition without which he cannot assume a role of leadership. This the school alone cannot do, neither can the shop nor the field. Let us not mislead ourselves. They are at best but the means to an end. The State must assume the responsibility for those whom it selects and certifies.

The Licensing Board represents the State and upon it devolves great responsibility. It should not be content to merely examine candidates. It should, through constant contact with professional engineers, ascertain the needs of professional practice. It should set the standards and set them so as to best promote and protect human society. To the accomplishment of those objectives wherein the engineering profession can best serve the people of America the National Society of Professional Engineers has dedicated its resources and its hopes.

PROFESSIONAL DIRECTORY

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Telegraph Bldg. Harrisburg, Penna.

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OPEN FORUM

(Continued from page 19)

Dear Editor:

On December 3rd, 1936 I attended a luncheon at the Midston House in New York City during the Annual Convention of the American Society of Mechanical Engineers, which was held to discuss the question of engineering education and, was largely attended by members of the S. P. E. E.

Very splendid talks were given by W. H. Carrier of the Carrier Corporation of Newark, New Jersey and N. E. Funk of the Philadelphia Electric Company, Philadelphia, Pennsylvania, followed by another paper by Prof. H. O. Croft of the University of Iowa, Iowa City, Iowa.

I am writing to suggest that you might find these papers valuable for re-publication in the AMERICAN ENGINEER. They may be seen on Pages 351-2-3-4 and 370 of the May issue of *Mechanical Engineering*. A brief review of the talks are also given on Page 380.

I would suggest that, if upon looking these over, you would like to use them in toto or abstracts from them, that you write to the authors for permission to use them in the AMERICAN ENGINEER, as I feel that the character of these articles are of distinct interest to all Professional Engineers, or perhaps anyone of these three authors would be willing to prepare a revised article for publication in your columns if requested.

Yours sincerely,
HARRY E. HARRIS.

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Sign of Need-For the Lightness of Aluminum!

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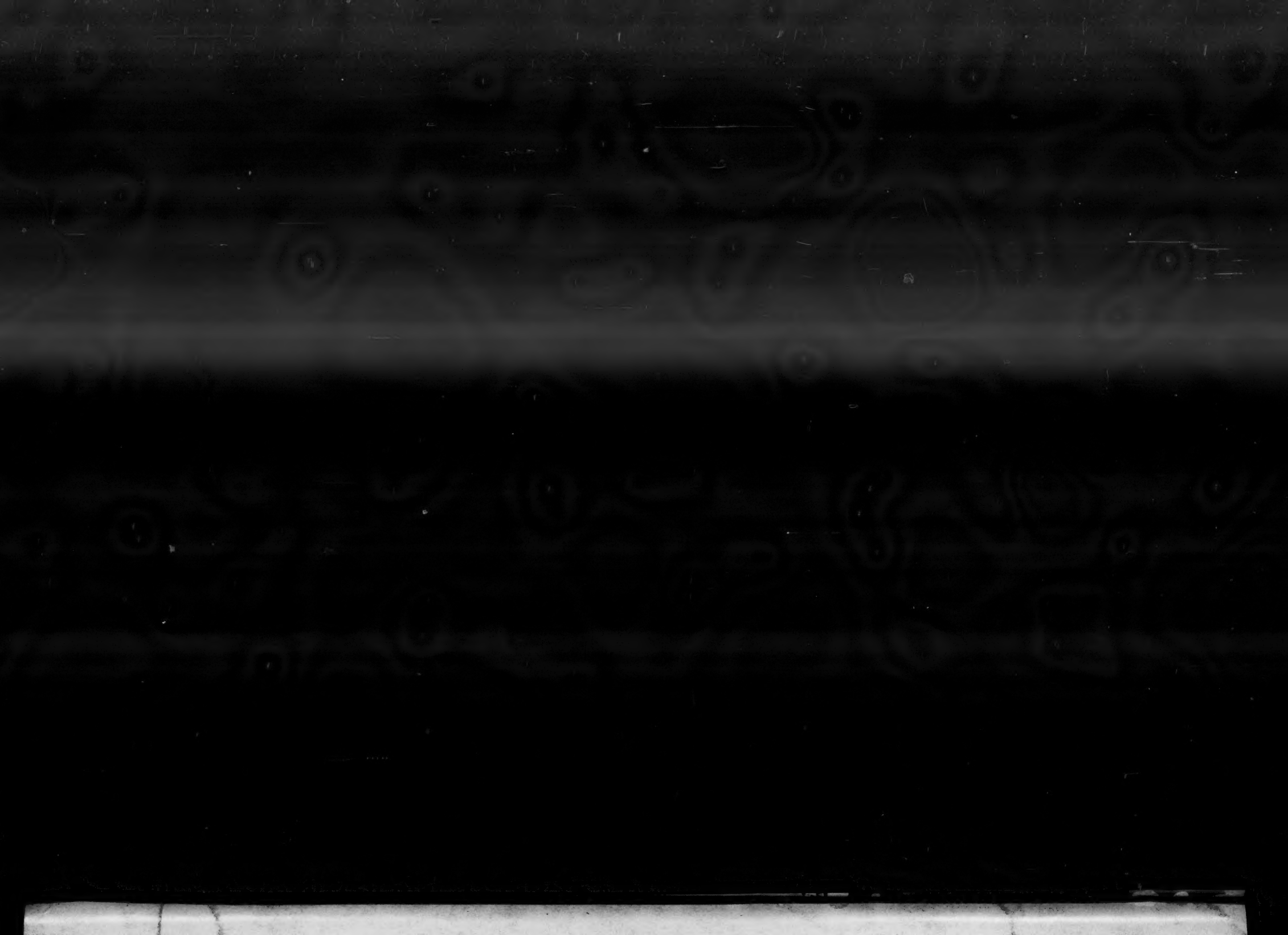
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